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CONFERENCE

ON THE

STATE AND PROGRESS OF PUBLIC WORKS

IN THE

PRESIDENCY OF BOMBAY.

SEPTEMBER 1866.

Bombay:

PRINTED FOR GOVERNMENT

AT THE EDUCATION SOCIETY'S PRESS, BYCULLA.

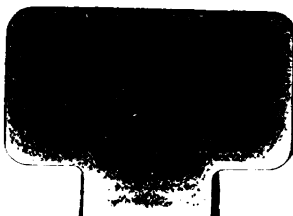
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CONFERENCE

ON THE

STATE AND PROGRESS OF PUBLIC WORKS IN THE PRESIDENCY OF BOMBAY.

—••••—

FIRST MEETING—MONDAY, 10TH SEPTEMBER.

—••••—

I.—ROADS AND COMMUNICATIONS.

—••••—

The Conference met at Poona on Monday, 10th September, and was presided over by His Excellency Sir BARTLE FRERE, G.C.S.I., K.C.B., and Governor of Bombay.

The following members of Government attended the Conference:—

His Excellency Sir ROBERT NAPIER, K.C.B.

The Honourable B. H. ELLIS.

The Honourable C. J. ERSKINE.

The following officers were present:—

His Excellency the Governor Sir H. B.	} The Governor and Council.
E. FRERE	
His Excellency the Commander in	
Chief Sir R. NAPIER	
Honourable B. H. ELLIS	
Honourable C. J. ERSKINE	
Colonel W. KENDALL	Acting Secretary to Government,
	Public Works Department.
J. W. HADOW, Esq.	Revenue Commissioner S.D.
L. REID, Esq.	Revenue Commissioner N.D.
R. TEMPLE, Esq.	Commissioner of Nagpore.
Major R. H. KEATINGE, V.C.	Political Agent, Kattywar.
Colonel H. W. B. BELL, R.E.	Superintending Engineer N.D.
Lieut. Colonel A. DELISLE, R.E.	Consulting Engineer for Railways and Reclamations.
Lieut. Colonel C. SCOTT, R.E.	Superintending Engineer S.D.
Lieut. Colonel W. R. DICKINSON, R.E.	Superintending Engineer P.D.
Lieut. Colonel R. L. PLAYFAIR, R.E.	Suptg. Engineer for Irrigation.

	<i>Station.</i>	<i>Collector.</i>	<i>Engineer.</i>
Southern Division.	Poona, Kirkee.....	E. P. DOWN, Esq...	II. S. HOWARD, Esq.
	Poona Districts	Do. ..	Capt. R. S. SELLON, R.E.
	Ahmednuggur	W. D'O'LY, Esq. ..	Major W. R. HOUGHTON.
	Sholapore	W. M. SALMON, Esq.	Lieut. A. R. SETON, R.E.
	Belgaum & Kolapoor.	None.	Not present.
	Sattara	J. R. ARTHUR, Esq.	Capt. A. FINCH, R.E.
	Dharwar	None	J. H. E. HART, Esq.
	Canara	None	None.
	Rutnagherry.....	None	R. W. WOODHOUSE, Esq.
Northern Division.	Ahmedabad	J. E. OLIPHANT, Esq.	Lieut. H. H. LEE, R.E.
	Khaira	A. BORRADAILE, Esq.	Lieut. J. L. MORANT, R.E.
	Khandeish	L. ASHBURNER, Esq.	Lieut. C. MARRYAT, R.E.
	Punch Mahals.....	None	E. H. LITTLE, Esq.
	Surat and Broach ..	J. A. G. DUFF, Esq.	Lieut. C. MANT, R.E.
	Tanna	{ W. HAVELOCK, Esq. } { J. ELPHINSTON, Esq. }	{ Capt. J. MAUNSELL, R.E. }
	Deesa and Aboo	None	Not present.
Presidency Division.	Presidency.....	KAHANDASS MUNCHARAM.	
	Architectural Engineer.....	Captain C. W. FINCH, R.E.	
	Reclamation Engineer	Lieutenant W. M. DUCAT, R.E.	
	Defences	Captain W. A. BAKER, R.E.	
	Revenue Survey Commissioner	Major J. T. FRANCIS.	
	Superintendent Revenue Survey N.D.	Major C. J. PRESCOTT.	
	Municipal Commissioner	A. T. CRAWFORD, Esq., C.S.	
	Rutnagherry.....	A. K. NAIRNE, Esq., C.S.	
	Political Agent, Kolapoor and Southern Maratha Country.....	Lieut. Colonel G. ANDERSON.	

HIS EXCELLENCY the PRESIDENT intimated that the Conference would proceed to consider the Public Works of the Presidency in separate branches, taking up first Roads and Communications; second, Military dispositions and Barrack accommodation throughout the Presidency; third, the Harbour Defences; fourth, the Reclamation works in the island and harbour of Bombay; fifth, Irrigation works and so on. But there were several officers present who were very anxious to get away to their stations, and it would be a matter of great convenience to them if the Conference could dispose first of all of the questions in which they were concerned, and it so happened that most of these questions related to the Southern Collectorates. The attendance of these gentlemen was principally required as to roads and a few irrigation works, and he there-

fore proposed to take up first all the subjects connected with communications in a few of the Southern Collectorates, and to begin with the road which ran from Poona to the Madras frontier at Hurryhur.

I.—TRUNK ROAD FROM POONA TO HURRYHUR—355 MILES.

It was one of the most important lines of road in this part of the country. Government had just received from Colonel Scott, Superintending Engineer of the Southern Division, a statement of what had been done last year, and what he proposed to do during the current season. It would therefore be simply necessary to ascertain what amount should be budgetted for submission to the Government of India at the end of the year. The present road was one of those works which was imperatively required.

LIEUT. COLONEL SCOTT, Superintending Engineer Southern Division, submitted a statement (Appendix A) as to the requirements on this road. It was to the effect that the kerbing on the whole line of the trunk road remained to be done, and that the metalling of the section from Poona to Sheerwul (26½ miles) was in progress. The bridge across the Koina river had been sanctioned, and was in progress, but detailed designs had not yet been finally determined upon. Plans and estimates for the bridge across the Warna river were in preparation, and plans and estimates for the bridge across the Punchgunga river in Kolapoor territory were also under preparation (Appendix B.)

(a) Section of said Trunk Road from Poona to Sheerwul—26½ miles.

CAPTAIN SELLON, Executive Engineer Poona Division, and in charge of that section of the said trunk road which extended from Poona to Sheerwul, a distance of 26½ miles, was examined as to the section under his charge. He stated that the section had been bridged and drained throughout, but that the kerbing had not been as yet sanctioned. If the kerbing were completed nothing would require to be done on his section after the present year except to plant trees along the sides of the road.

The HONOURABLE MR. ELLIS thought the planting of trees had better be done along this road as it had been done at Sattara, namely, by village grants. That was the better plan than making the road proceed by simple stations. He did not mean that the village should plant the trees, but that the Collector should make certain allowances, whereupon the villagers should receive charge of the trees, a system which worked very well indeed.

MR. ARTHUR, Collector of Sattara, said, in reply to the President, that the system which had been adopted in Sattara was that some of the planting work required in connection with roads had been executed from funds sup-

plied for the repair of any road by the Executive Engineer, who handed the tree planting on the road over to the Assistant in charge of the Talooka, who in turn put it into the hands of the patels of the several villages. In some cases the patels got contributions from the villages themselves. When trees were planted the owners of fields adjoining the road were granted the right of collecting the fruit of fruit-bearing trees along the edge of their properties, provided they looked after all the trees planted within their respective properties along the road. Around each tree also there was a small patch of grazing which they were allowed to make use of in order to make it worth their while to attend to the trees.

The HONOURABLE MR. ELLIS added that in some cases where trees were planted along the edge of a field the owner of the field contributed a certain sum towards the expense of watering the trees, in return for which he was to have the benefit of the fruit. When the tree died he was to have the wood of it, but he was never to cut it down until it died.

CAPTAIN SELLON said that while a road was in progress it was the Executive Engineer, and afterwards the heads of the Collector's department, who had charge of it. One-half of this road was to be planted by the Collector's department, and in some places the planting had been commenced, but for ten miles nothing whatever had been done; a few cuttings had been put in in anticipation of sanction being received for the planting of the road. He (Captain Sellon) would prefer undertaking the planting of the road himself to handing it over to the civil officer with a view merely to the planting being done, and if he had the money he would do it at once. He thought his department could protect the trees better than the civil officer because his department had always an establishment on the road, and parties of men were kept up at distances of a few miles.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that the principal thing he would be afraid of in the zemindaree system of planting trees was the want of uniformity; he did not speak of uniformity in the kind of trees to be planted, but he referred to regularity in planting and watering trees.

(b) *Section of said Trunk Road from Seerwull to Kolapoor frontier—104 miles.*

CAPTAIN FINCH, Acting Executive Engineer Southern Division, and in charge of that section of the said Trunk Road which extended from the Neera Bridge at Seerwull to the Kolapoor frontier, a distance of 104 miles, was next examined as to the section under his charge. He stated that sanction had been obtained for the expenditure upon the formation of this road of half a lakh, which would not be sufficient this year as he could easily expend another half lakh or perhaps more upon it. The cost of metalling the whole of his section and widening the road where necessary would be five lakhs of

rupees, and of that sum only half a lakh had as yet been received. The metalling was, however, the more important of the two, and had been completed over nearly eight miles.

HIS EXCELLENCY the COMMANDER-IN-CHIEF had seen the state of this road, which for want of metalling was bad. The Side Slopes. road was practically of little use in wet weather. It was of *some* use certainly because a person could get across the country, but very slowly. One thing had occurred to him when he saw the road, and that was that the side slopes were too steep. They made the road very dangerous in some parts of the country, but of course these slopes had been made of that steepness for the purposes of economy.

CAPTAIN FINCH, in answer to the President, said that he could expend the whole lakh this year, and it would be as much as he required. Next year he would require a lakh and a half, which leave 2½ lakhs for future years.

HIS EXCELLENCY the PRESIDENT said the question of providing another half lakh was before Government, and there would be no difficulty in carrying on the works.

CAPTAIN FINCH, in answer to several questions by the President, the Commander-in-Chief, and Mr. Ellis as to the Bridges. bridges along the road, stated that all the bridges in his section were completed with the exception of the one across the Koina river at Kurrar, which had been sanctioned and was in progress. The detailed designs had not yet been finally determined, but from the nature of the bottom it was very difficult to obtain a foundation.

HIS EXCELLENCY the PRESIDENT said the Koina was a very large river, and twice during the last thirty years the whole of the Southern Maratha Country had been in a state of insurrection, and the vital question was whether troops going down into the country could manage to go across that river. On the occasion of the two insurrections referred to they did get across, but on the last occasion they got across just in time to enter Kolapoor and to prevent disaster. It was a very difficult bridge to deal with. One of the principal difficulties was that while boring for a foundation, and after going through soft soil, hard gravel was come upon. After passing through the hard gravel, rock was reached, but it was found that the supposed rock was only a huge boulder. Supposing this bridge to be built, the road would also have to be metalled within the course of three years. In the Kolapoor territory there was great want of bridges. There was a bridge required across the Warna river, and also a bridge across the Paunchgunga river, for each of which, as Colonel Scott had mentioned in his statement, the plans and estimates were under

preparation. Perhaps Colonel Anderson, the Political Agent for the Southern Maratha Country, could inform the Conference what chance there was of help from the Kolapoor Government towards the building of the bridge on the Paunchgunga river near the capital of that state.

(c) *The Kolapoor Government and the Bridging of Paunchgunga River.*

COLONEL ANDERSON thought the road would be of comparatively little importance to the Kolapoor Government, and if assistance was given by that Government it would be of small amount.

HIS EXCELLENCY the PRESIDENT said the British Government was laying out a very large sum on this road. In the middle of the district it traversed lay Kolapoor through which it passed, and which got the benefit of what the British Government was doing in Poona, Sattara, Dharwar, and Belgaum.

COLONEL ANDERSON said that the contribution of the Kolapoor Government would depend principally upon the funds available. Several works had been sanctioned by the Government of Kolapoor, and he could not say what funds were at the present moment at its disposal.

HIS EXCELLENCY the PRESIDENT said that up almost to the present moment the Kolapoor Government had never been out of debt, and it was only within the last few months that the debt had been taken off. Now, under these circumstances the Kolapoor State should come forward and bridge the Paunchgunga river which passed the capital. The amount required for that purpose was very small indeed, and if the Kolapoor Government were to bridge the river effectually the cost would be a very small part, speaking proportionally, of the expense of the road. No estimate had yet been made, but it was just one of those cases which the Kolapoor Government should take up.

COLONEL ANDERSON thought the Kolapoor State should assist to a certain extent, but to what extent he could not say without information as to the works which the Kolapoor Government had undertaken and the funds available.

The HONOURABLE MR. ELLIS remarked that the outlay did not need to be without a return, as the Kolapoor Government might put a toll upon the bridge.

HIS EXCELLENCY the PRESIDENT said that the construction of a road along this district of country had been in progress for forty-five years, and a good deal was now being laid out upon it. The road was in fact the great North and South line of communication, and was likely to be so for the next generation.

COLONEL ANDERSON thought the question was only one of expense.

HIS EXCELLENCY the PRESIDENT replied the amount to be contributed by Kolapoor was properly one of degree, and when Colonel Scott had finished the plan and estimate it would be seen what that degree should be.

(d) *Belgaum Section.*

In reference to the Belgaum section of the said trunk road,

LIEUT. COLONEL SCOTT stated that the drains had been sanctioned. As to the bridge across the Malpurba river nothing could be done just now. It had been designed by Captain Merriman a couple of years ago, but there was nothing to show whether the foundations had been designed, and what the nature of the bottom was.

LIEUT. COLONEL PLAYFAIR, who had formerly been Executive Engineer Southern Division, in answer to the President, stated, in reference to the bridge across the Malpurba river, that the first thing to be done was to bore in order to ascertain the nature of the foundation.

LIEUT. COLONEL SCOTT had a design for the bridge but was doubtful about sending it in as he did not know to what extent Mr. Hart, who had charge of the Dharwar district, had borings below the surface.

HIS EXCELLENCY the PRESIDENT explained to the Commander-in-Chief that the great gap along this road at present was at Kolapoor, where there were two very large rivers to bridge; but supposing that the British Government bridged the frontier one, and that Colonel Anderson could help to get the other close to Kolapoor itself bridged, this gap would be completed. The next serious gap was at Malpurba, and Mr. Hart, who had charge of the Dharwar district, would have to finish all the bridges in that district on the road being formed through it. If his charge were extended ten miles further along this road they might hope to get designs for a bridge over the Malpurba river.

II.—MILITARY JAIL AT PAUNCHGUNNY—BRANCH ROAD THERETO, AND CARRIAGE ROAD TO MAUNDER DEO.

HIS EXCELLENCY the COMMANDER-IN-CHIEF had a military suggestion to make in connection with the road they had just been considering. It appeared very urgent that a new military jail should be built, that of Bombay being extremely bad, and after considering all the places that might be suitable for it, he had come to the conclusion that Paunchgunny would be the best site for it. Looking all round the Presidency he could not find any place suitable on the railway, and he therefore thought that climate should determine the question. Prisoners could remain at Paunchgunny throughout

the whole year; there was plenty of water there; and it was certain of visitation once a year, as all the authorities would have occasion to pass that way. If Paunchgunny were selected a proper road would require to be made, and it would be a branch of the road from Poona to Hurryhur. A proper carriage road would also be required to Maunder Deo, which would also be a branch of this road. These were urgent works, and he thought provision should be made for them in the present year. In answer to the President, His Excellency remarked that of the lines which had been examined by Colonel Phayre for the Maunder Deo road, the one from the new Neera bridge should be adopted.

In answer to some questions from the Honourable Mr. ELLIS,

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that he thought the jail should be for military prisoners alone, of which class there were about thirty at present in the Bombay jail. But it very frequently happened that prisoners were detained with their regiments for want of space in the jail at Bombay. He thought it better that military prisoners should be kept separate from other prisoners. In theory they were kept separate in the jail at present. All prisoners after they had undergone their punishment had to return to their regiments. Three men had been sentenced to ten years' penal servitude, and two of them were sent home to undergo their punishment, but the Horse Guards had ordered that they should return to their regiments after completing their term of imprisonment. The offences of soldiers against military discipline, though requiring severe punishment, were generally of a less criminal character than those of the civil prisoners.

HIS EXCELLENCY the PRESIDENT said it had already been decided that there should be a military prison separate from the civil one, and authority had been obtained to build it, but the only reason why it had not been commenced was that a site could not be agreed upon. One person was in favour of a hill fort, and others were in favour of other positions, and there were discussions upon the question of a site until the Commander-in-Chief went up to Paunchgunny. He (the President) felt quite convinced it would be difficult to suggest any better place. The authority to build the prison had been accompanied with detailed instructions as to the way in which the prison was to be supplied so that soldiers might return to their regiments efficient soldiers.

HIS EXCELLENCY the COMMANDER-IN-CHIEF, in answer to a question by Mr. Ellis as to the possibility of an outbreak among military prisoners in a purely military jail, and whether, since troops were to be at Maunder Deo, it would not be better to have the jail there also, said that the presence of

troops at Mander Deo would not induce him to give preference to Mander Deo as a site for the military prison. It might seem that the mere presence of troops in the neighbourhood of a military prison might prevent an outbreak among the prisoners, but the fact was that in a properly constructed military prison an outbreak was almost impossible. One or two armed men on guard could keep such men down. What would be the use of men breaking out at Paunchgunny? A man could not go twenty-four hours there without being caught. As to the road to the hill station at Mander Deo, the saving of the distance by the line of road he preferred would pay over and over again the cost of making the carriage road from Neera Bridge to Mander Deo. It would be of the utmost importance to adopt the shortest road. He would send all the sick and ailing men up in the night, as was done at Nusseerabad and Deesa, where that plan had been attended with the most salutary results. In a fortnight or three weeks the men who showed symptoms of breaking down were quite set up, and it would be fortunate if the same results could be accomplished at Mander Deo also. Although there were the outlets in this district of Poorundhur and Singhur, still they were limited in extent, and did not possess the climatic advantages possessed by Mander Deo. He thought everything was in favour of having a direct carriage road from the Neera Bridge.

CAPTAIN FINCH was then instructed to prepare plans and estimates for the work requisite in connection with the branch roads to the proposed military prison at Paunchgunny and the military station at Mander Deo, as also plans of the military prison at Paunchgunny. The Commander-in-Chief undertook to give him instructions as to the buildings so as to enable him to prepare the plans in time for the present budget.

III.—REST-HOUSES FOR TROOPS BETWEEN POONA AND MANDER DEO.

HIS EXCELLENCY the COMMANDER-IN-CHIEF had another suggestion to make, and that was in reference to the erection of sufficient Rest-houses for troops between Poona and Mander Deo. He proposed that there should be three sets—one set at the bridge where the road would diverge, and the second and third set part of the way up the hill, so as to give three easy rest-places. He presumed that the Quarter Master General had sent in notices concerning these houses.

COLONEL KENDALL said that no notice had been received by the Public Works Department, but notice might be in the Military Department. The Government of India had sanctioned Rest-houses of a most complete character, containing accommodation for single officers, for married officers

and their families, for one or two soldiers, and for 150 men. In the case of the Rest-houses proposed by His Excellency the Commander-in-Chief, the question remained to be determined what accommodation should be provided, whether for 100 or 150 men.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said that would depend upon the style and cost of the Rest-houses.
Cost of permanent Rest-Houses. If the Rest-houses proposed would be expensive, he would confine them to 100 men.

COLONEL KENDALL remarked that they would be expensive, as the standard plan required that they should be built in a complete style.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** thought something less expensive would be sufficient. But the only point on which a decision could at present be come to was the number of men that would require to be provided for. He would like, however, in the first instance to consult the Quarter Master General. Of course if there was any difficulty he would be prepared to accept temporary accommodation, but here the price of materials was so high that a temporary building seemed to cost as much as a permanent one.

THE HONOURABLE MR. ELLIS said if Rest-houses were erected the money question came to be one of five lakhs of rupees, whereas if temporary erections were adopted it was a question of only Rs. 80,000 or Rs. 90,000.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said that if it were so he would be quite satisfied with temporary erections. He also remarked, in answer to Lieut. Colonel Scott, that he was bearing in mind the importance of the road through Mander Deo to the town of Wae, and that a coating of metal would be required for it.

Plans of temporary erections ordered. Plans of the temporary erections, in place of permanent Rest-houses, were then ordered to be prepared by the Executive Engineer of the District.

FOREST ROAD FROM HALLIAL TO DHARWAR.

MR. HART, in charge of the Dharwar district, mentioned that the road from Hallial to Dharwar was much used for the cartage of timber, and the traffic was so heavy that the metalling of the road was worn out yearly.

HIS EXCELLENCY the **PRESIDENT** said that nothing could be done without good metalling. Mr. Hart had sent in for two years the plans and estimates for the metalling of the road, and it appeared now that by a late sanction the means were now at hand of giving out of the Forest revenues the money required for the repair of the road. It only remained for the Collector and the Executive Engineer to apply for it. Perhaps Mr. Reid could say whether the work could be done out of that fund.

MR. REID, Acting Revenue Commissioner Northern Division, replied that it could be done.

MR. HART, in reply to the Commander-in-Chief, said that the metalling of that road would not interfere in the labour market with the trunk lines from Belgaum, because the road passed through different lines of country, and the labour could not be moved about very much in the districts.

HIS EXCELLENCY the **PRESIDENT** remarked that to enable the funds to be obtained it would only be necessary for the Collector to put the road in his next Forest Budget.

The **HONOURABLE MR. ELLIS** added that it would come within the Forest Budget of the Canara district, which fortunately had a large surplus. The Conservator had nothing whatever to do with the money, which was in the hands of the Collector. Mr. Hart ought to consult the Collector, and if he obtained his consent to the repair of this Forest road, he ought to get the Collector to bring the matter before Government, and obtain the sanction of the Conservator to budget it as a charge against the Forest Revenue. It was by no means to be budgetted as an imperial road.

MR. HART said that in the meantime there was an estimate of Rs. 21,000 for clearing the road.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said that the transport of forest timber was very destructive to the roads, and would be greatly facilitated by a tramway. In some localities what were called pot-sleepers were used with advantage. The possibility of using these, however, on the present road would depend on the gradients.

MR. HART remarked that the road was very steep.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** replied that that settled the question against their use.

DHARWAR AND GOA ROAD.

A letter from Mr. Shaw Stewart was read on the subject of the Dharwar and Goa road (see Appendix).

HIS EXCELLENCY the **PRESIDENT** explained the nature of the arrangement between the British and Portuguese Governments in reference to this road, which was that if the Goa Government constructed the road to their own frontier, the British Government would continue it through the Ghauts. The construction of the Ghaut line was a promise of Lord Elphinstone's, and being therefore a matter of honour there was no need for discussing it. The British Government was pledged to do the work.

The Conference adjourned till Wednesday, the 12th September, at 11 o'clock.

SECOND DAY.—WEDNESDAY, 12TH SEPTEMBER 1866.

The Conference met again on Wednesday, 12th September, at 11 A.M., His Excellency Sir BARTLE FRERE, G.C.S.I. and K.C.B., presiding.

I.—BARRACK ACCOMMODATION.

The subject taken up by the Conference was the state of the Barrack accommodation throughout the Presidency, and Colonel Phayre, Quarter Master General, handed in a report thereon (Appendix D).

I.—POONA DIVISION.

The requirements of the Poona Division of the Presidency were first considered (Appendix D).

(a) *Poona and Kirkee Station.*

COLONEL KENDALL read an abstract of the requirements for Poona and Kirkee station (Appendix D).

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that the Quarter

Mander Deo.

Master General's report embraced all that was required at Poona and Kirkee, because, as he had mentioned at the former meeting of the Conference, his views extended to a set of permanent barracks at Mander Deo. These barracks at Mander Deo were intended to receive one regiment. His proposal was for barracks for two regiments of European Infantry—the barracks for one regiment to be put up at Mander Deo, and the barracks for the other to be put up at Kirkee. He also

Wanowree.

proposed in addition the necessary buildings for completing the shelter for one wing at Wanowree. There would then be barrack accommodation of the first class for a complete wing at Wanowree, and for a regiment at Mander Deo, and for a regiment at Kirkee.

In answer to the Honourable Mr. ELLIS,

HIS EXCELLENCY the COMMANDER-IN-CHIEF remarked that how-

Kirkee.

ever anxious the Government might be to have barracks at Kirkee, it would take some time before they could be got ready, notwithstanding all the zeal of the Engineering Department; but if in the course of the cold weather a portion of the shelter at Kirkee could be obtained, that would allow part of the existing dépôt barracks to be removed. These dépôt barracks have been condemned for many years. They were so bad in themselves, and were so badly placed, that they were most dangerous in a sanitary point of view, and have frequently been

the first to be visited by sickness ; they should not be occupied another season if it be possible to avoid it. Under any circumstances one-half of them should be pulled down during the cold season even if temporary shelter had to be erected instead of them.

The HONOURABLE MR. ELLIS said that barracks at Kirkee were most emergently required.

COLONEL SCOTT, in reply to His Excellency the PRESIDENT, said he did not know how it would be possible to furnish the whole barracks sufficiently to afford shelter. It might be better to thatch over the lower story for a season.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that thatch would be a much better roof than most of the inhabitants had at present, as they lived generally under thin tiles, which afforded a very insufficient covering from the sun.

COLONEL PHAYRE undertook, on the suggestion of His Excellency the PRESIDENT, to point out where the additional barracks at Wanowree should be, so that they might be commenced at once.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said, in reply to His Excellency the PRESIDENT, that it would have to be considered whether the proposed barracks at Wanowree should be uniform with those of the 33rd Regiment, or whether they should be on a new plan which was now generally adopted. It would be better to have the new plan.

COLONEL SCOTT said that he had a new plan of the barracks. It would be desirable to take into consideration how these new barracks should be placed with reference to what should be done afterwards.

HIS EXCELLENCY the COMMANDER-IN-CHIEF, so far as he could see for the future, was not disposed to increase the accommodation in Poona beyond making it perfect for one wing. The position now occupied by the 33rd Regiment was the best, and verandas only were required to make the buildings first-class barracks.

COLONEL SCOTT said there was a good deal of space lost.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said he did not think the space was lost, but verandas were wanted as the sun beat very painfully into the rooms. The beating in of the sun could be prevented by light iron structures.

HIS EXCELLENCY the PRESIDENT remarked that the place for their erection had been decided upon, and the money had been obtained, and all that was wanted now was the plan for the Wanowree barracks.

HIS EXCELLENCY the PRESIDENT remarked that nothing more was required to be done for Poona at present, and it was to be understood that as soon as the plans were approved of they might be put in hand. But that would not enable the Commander-in-Chief to dispense with the depôt until something was done, and in the meantime perhaps the Commander-in-Chief would explain what his wishes were with regard to Kirkee.

HIS EXCELLENCY the COMMANDER-IN-CHIEF requested Colonel Phayre to exhibit to the Conference the proposed plans for the accommodation required at Kirkee, which were accordingly laid before the meeting. His Excellency added that he proposed to carry on the extension from the hospital. There was space on that ground for eight companies. It was incomparably the best ground, and the only point which caused hesitation was the space between that and the Government House. The ground was, he thought, sufficiently near the rest of the station. It would be observed that the existing barracks were built in a very objectionable way, being very close together. It would be necessary eventually to have them thinned out. Considering the tendency of Bombay to move up to Poona, they should bear in mind the probability of the military entirely evacuating Poona and moving out to Kirkee. It would be a long process, but it would be inevitable, and therefore it would be wise to preserve room for them. He would therefore propose that the accommodation required at Kirkee should be placed on the ridge—the summit was the best place.

HIS EXCELLENCY the PRESIDENT said that the only defect found in the present accommodation was that of the wind being almost too much for them, and they required in consequence to keep the house very much shut up.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought that venetians in the verandas, such as were seen in Parsee houses in Bombay, seemed to be the best way of tempering the wind.

COLONEL PHAYRE said that the design could now be drawn; the design for the infantry barrack had been fixed upon, but in consequence of want of space it had been drawn for full company barracks. He then submitted block plans of artillery barracks, remarking that the Kirkee barracks would be on the same plan.

HIS EXCELLENCY the COMMANDER-IN-CHIEF supposed that in cases of emergency the work could be begun immediately.

COLONEL KENDALL said it could so long as the principle of the standard plan was adhered to.

COLONEL PHAYRE submitted block plans of the proposed upper story of the barracks (see Appendix).

COLONEL KENDALL remarked that the Government of India, before any permanent barracks were commenced, required a plan to be sent up showing the direction of the prevailing winds, and the nature of the soil. This plan should be set about at once.

On the suggestion of His Excellency the **PRESIDENT**, Dr. Leith, Colonel Phayre, and Colonel Scott were instructed to mark off on the plan of Kirkee the place where such block would be, and also the direction of the prevailing winds.

In answer to His Excellency the **PRESIDENT**, who inquired how the designs for the Gun-Carriage Factory stood, **COLONEL KENDALL** said it had been decided by the Commander-in-Chief that the Gun-Carriage Factory should be inside the Fort, and it was to be worked up by Captain Mathew into the general plan of the Fort. Last year it had been decided to have it outside the Fort, and plans were made accordingly, but this year it had been resolved to have it inside.

His Excellency the **PRESIDENT** asked the Commander-in-Chief if he had any military disposition to make of the ground across the Bund—the ground between Holkar's bridge and the Bund.

His Excellency the **COMMANDER-IN-CHIEF** replied that the native part of the regiment of Sappers had been removed to Kirkee, and the European part would follow. Captain Macdonald had told him that he had found very great difficulty in obtaining a site for the Sappers' head-quarters. His view rather turned to the bend of the river between the Bridge and the Bund.

In reply to a further question from His Excellency the **PRESIDENT**, His Excellency the **COMMANDER-IN-CHIEF** said that nothing further was required to be done at Mander Deo except to decide on the plans, and to have an efficient executive establishment to estimate for the barracks and the road. The road and the barracks should go on simultaneously. The road was very much wanted.

COLONEL PHAYRE submitted a rough block plan of the Mander Deo barracks (see Appendix), and the **COMMANDER-IN-CHIEF** remarked that he thought the same kind of barracks which would do for Kirkee would do for Mander Deo. They would be cheaper on the hill than single-story barracks, because there was only one roof required instead of two. There was no chance of the roof being blown off.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** continued that day-rooms would be necessary. In every barrack the

Day-rooms. soldiers should have some place to go to during the day besides the sleeping apartment. It seemed the duty of the military authorities to lead the soldier to live as other people did, and not to have him hanging all day about his cot. He should therefore have a place where he had some proprietary right, and where he could go and read or write his letters. He should even have something more in the hills than in the lower stations, because in the hills he was rather more in want of employment.

Mander Deo. The best way of proceeding with the Mander Deo works would be that a portion should be specially taken in hand and pushed on rapidly, so as to be completed as quickly as possible. By this means a portion of the men could be sent up.

The **HONOURABLE MR. ELLIS** thought it was better to have money invested in permanent barracks than in a temporary sanitarium.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said there was a point which had not yet come up in a public works point of view, and that was the political advantages of Mander Deo. The erection of barracks at Mander Deo would obviate the erection of barracks at Sattara, inasmuch

Sattara. as a regiment being within Sattara territory equally fulfilled the treaty by which the British Government was bound to keep a certain number of troops in Sattara.

HIS EXCELLENCY the **PRESIDENT** assented, but added that there were sufficient barracks at Sattara.

COLONEL PHAYRE said that the Sattara barracks did not meet all the necessary requirements.

HIS EXCELLENCY the **PRESIDENT** inquired whether, in the event of the Mander Deo barracks not being built, the Sattara barracks would have to be rebuilt.

COLONEL PHAYRE said they would.

In reply to **HIS EXCELLENCY** the **PRESIDENT**, it was stated by **HIS EXCELLENCY** the **COMMANDER-IN-CHIEF** and **COLONEL SCOTT** that a good deal of work might be done by the men themselves, who when paid fairly appeared anxious to work.

(b) *Ahmednuggur.*

An abstract of the report of the Quarter Master General in reference to this station was read (Appendix D).

In reply to **HIS EXCELLENCY** the **PRESIDENT**, who asked in what state the plans for the works at this station were, **COLONEL SCOTT** said that the Secretary in the Public Works Department had made inquiries of the Sanitary

Commission whether or not the plans proposed would be considered suitable; and COLONEL KENDALL (also in reply to the President) stated that Rs. 80,000 were available for the work.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that the only point on which there had not been a settlement of the plans was the question of ventilation.

COLONEL SCOTT remarked that the question of ventilation had been attended to in the present barracks, and he submitted block plans showing the ventilation proposed to be supplied.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said his idea was to supply the barracks with ventilating airshafts and with fireplaces; and in reply to an objection of Colonel Scott's that such would add considerably to the expense of the building, he suggested that the airshafts might be of iron. It was a question for the Sanitary Commission, but with so much money laid out on the buildings, everything which would tend to make them perfect should be adopted.

Ventilation by means of airshafts.

HIS EXCELLENCY the PRESIDENT said there could be no reason why the system of ventilating airshafts and of fireplaces should not be tried.

Fireplaces.

COLONEL SCOTT had come to the conclusion that portable fireplaces were better than fixed fireplaces.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that was a point he would submit to the Sanitary Commission, because their authority must determine what must be done. He himself would prefer fixed fireplaces, because they gave no trouble in building, and when one came to northern latitudes they became a necessity. The places where the fire should be were points for the Sanitary Commission, to whom Colonel Phayre could submit the question.

Mutual action of Sanitary Commission and Engineering Department.

COLONEL SCOTT explained that the Engineering Department had met with considerable difficulty in getting these plans passed by the Sanitary Commission. Plans of the buildings at Nuggur had been sent in several times, but he could not get the Commission to approve of any of the plans which had been laid before it. The Commission would not communicate with an Executive Officer.

COLONEL BELL, in answer to His Excellency the President, explained the difficulty that prevented the Commission from passing plans. It was customary to send to the Commission plans prepared to the minutest detail in accordance with the standard plan of the Government of India, whereas some

modification was required to suit the locality in which the building was to be placed. Moreover printed reports for the guidance of the Engineer officers were not at hand, one or two copies only having been supplied.

HIS EXCELLENCY the PRESIDENT said that these sanitary questions were not political secrets which it was desirable to keep, and when any proceedings which had been once printed might be of use to an Executive Officer, a sufficient number of copies of the proceedings should be sent to every Executive Officer and to every Assistant Executive Officer and Serjeant, so that they might have them in their hands and know what to do. Were such proceedings not printed?

COLONEL KENDALL replied that they were printed in the Military Department.

HIS EXCELLENCY the PRESIDENT said that in that case it was only the price of so much paper that was required.

COLONEL BELL said that he would take care that His Excellency's remarks were made known to Dr. Leith.

MR. HART, in reply to His Excellency the PRESIDENT, said that he also had received back from the Commission plans which they had rejected, along with an order for them to be redrawn on account of the changes which were not provided for in the circular or standard plans.

COLONEL BELL said that when the plans went before the Commission the Commission had to state their opinion upon them. They all knew that these circulars were intended for general guidance in the Bengal Presidency, and that they had to be modified to suit the requirements of the Presidency of Bombay.

HIS EXCELLENCY the PRESIDENT asked if the Commission laid down any scheme by which the Executive Officer could understand what was wanted of him?

COLONEL BELL said that the standard plan came from Bengal, and had to be adapted in its general details to this Presidency. There were minor details in which the plan required to be altered to suit the various climates on this side of India. The Commission had to specify the points in reference to which alterations should be made.

COLONEL PHAYRE said that the Sanitary Commission objected to issuing any scheme of alterations on the standard plan of the Government of India, because any alterations they might suggest might be applicable to one plan and not to another. A latitude was allowed in this Presidency in minor details, and the ventilating shafts which had been suggested by the Commander-in-Chief was an illustration of a departure from the standard plan in a minor detail.

COLONEL BELL said that if Colonel Scott would wait on the Commission the plans would be disposed of personally. As far as possible standard plans would be sent out, but it was not the business of the Commission to prepare standard plans. It was the business of the Commission to comment on plans submitted to them.

(c) *Asseerghur*.

COLONEL KENDALL read an abstract of the requirements for *Asseerghur* (Appendix D).

CAPTAIN SELLON having informed the Conference as to the progress made with the plans,

Mutual action of the Sanitary Commission and the Engineering Department.

HIS EXCELLENCY the COMMANDER-IN-CHIEF, reverting to the discussion as to the mutual action of the Sanitary Commission and Engineering Department, said there seemed to be some irritation or impatience on the part of the Executive Officers for having constantly to alter their plans, and that was one of the reasons which led His Excellency the President to desire the assistance of an officer of the Sanitary Commission for the general revision of military plans, so that the details required might be made known to the officers at once, and thereby save a great deal of time and trouble involved in the returning of plans. Perhaps it would be well if all the Executive Officers would remember that the time was one of transition in military buildings, and that all parties were required to exercise a great deal of patience and forbearance with each other. There had been a great change of opinion in regard to what was required for soldiers within very recent times, and the Sanitary Commission was endeavouring to arrive in every way at the most perfect kind of building, and made proposals and suggestions which might cause inconvenience to the Executive Officer; still it was desirable that every possible improvement should be obtained. No doubt when these considerations were borne in mind they would modify a little the irritation among the Executive Officers towards the action of the Sanitary Commission. It was certainly provoking to any one to find that he had prepared plans, and that he had to alter them; but it was better that they should be altered than to find afterwards that the building did not possess all that was required.

COLONEL KENDALL said the action of the Sanitary Commission had been salutary, and the Commission had stood in the way of many mistakes being committed.

HIS EXCELLENCY the PRESIDENT said that what he was more anxious to bring to the notice of the officers concerned was that when they were all together they might save much time and writing if they would personally come

to any understanding as to what was wanted. If more light on any particular point was wanted, or if criticism or any particular design was required, that could always be afforded very readily while the Executive Officers were here, so as not to lose time and trouble by correspondence.

(d) *Belgaum.*

An abstract of the requirements at Belgaum cantonment was read (Appendix D).

COLONEL SCOTT, in reply to His Excellency the PRESIDENT, said that he intended to send a copy of the plan to the Sanitary Commission when everything was settled. He was now armed with the means of going on when he had his estimates made.

(e) *Colaba.*

COLONEL KENDALL read an abstract of the report of the Quarter Master General in reference to Colaba (Appendix D).

HIS EXCELLENCY the PRESIDENT remarked that none of these works had been provided for in the present budget.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said the Sanitary Commission, in considering the disposal of the barracks, found there was not room to put them in the original form, and they came to the conclusion that they would be obliged to have 3 three-storied barracks. By adopting that plan there would be room.

COLONEL PHAYRE said that the site of the barracks had been fixed, and that having been done, the subsidiary and auxiliary buildings could be proceeded with. The plans submitted would necessitate a few more auxiliary buildings, but would save space. This, with the other necessary proposals, would be placed in Captain Baker's hands, and as soon as they were done they would be sent back to the Superintending Engineer, or rather to Government, with all the recommendations. There was no alteration in the form of the barracks, but greater space would require to be given in the centre.

(f) *Aden.*

COLONEL KENDALL read an abstract of the Quarter Master General's report on the requirements at Aden (Appendix D).

COLONEL DICKINSON, in reply to His Excellency the PRESIDENT, thought nothing could be done this year, except perhaps laying the foundations.

The Conference then adjourned till Tuesday, 18th September.

THIRD MEETING—TUESDAY, 18TH SEPTEMBER 1866.

II.—BARRACK ACCOMMODATION—*continued.*

II.—NORTHERN DIVISION.

The Conference assembled again on Tuesday, 18th September, His Excellency Sir BARTLE FRERE, G.C.S.I. and K.C.B., presiding.

The Conference proceeded to take into consideration the barrack accommodation of the Northern Division of the Presidency.

(a) *Ahmedabad.*

The Quarter Master General's report on the barrack requirements of the Presidency was read (see Appendix).

In reply to His Excellency the PRESIDENT, COLONEL BELL stated that instructions regarding the increased accommodation at Ahmedabad for European infantry had not reached the Public Works Department.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said it had only recently been considered that the additional companies of European infantry should be stationed at Ahmedabad, and it had not therefore been expected that more accommodation would have been arranged for. The Commander-in-Chief found the matter in an undefined position, but there was a general idea that barracks were to be built.

COLONEL BELL stated that he was informed that ground had recently been selected for barracks for two batteries of artillery and three companies of infantry. The ground adjacent in the centre of the racecourse was originally set aside by Sir William Mansfield for a fortified enclosure, but the site had been considered too near the troops, and now another site had been sought for the enclosure. It was to contain the ordnance and military stores, and he thought barracks for one company of infantry. He submitted a block plan of the present barracks at Ahmedabad, and pointed out where it was intended to construct the new barracks.

In reply to His Excellency the PRESIDENT, HIS EXCELLENCY the COMMANDER-IN-CHIEF said he did not think that the force with the two batteries of artillery should be less than three companies. A great deal of discussion had taken place one way and another as to the troops at Ahmedabad. Colonel Phayre was of opinion that it would not be proper to leave the district without troops. There was a great advantage in having two batteries of artil-

lery at the head of the railway, for if they were wanted for the defence of Bombay they were at hand. He had received a letter from Colonel Arthur strongly urging their advance towards Deesa, but he (His Excellency) thought Colonel Arthur had not sufficiently considered the necessity of a connection between Deesa and the Presidency, and that their removal to Deesa would leave a very long line of country over which troops would have to travel if they were required at Bombay.

The HONOURABLE MR. ELLIS said that if the troops left Ahmedabad the police force would require to be increased, which was not advisable.

Fortified enclosure. His EXCELLENCY the COMMANDER-IN-CHIEF, in reference to the site of the fortified enclosure at Ahmedabad, said that the ground originally intended for it was the best ground, and it was proper therefore to give it for the troops instead of using it as a fortified enclosure. There would still, however, be a fortified enclosure. To obtain a site for the barracks the present racecourse might be utilised. Government was entitled to claim the best site for habitations, and a new racecourse could be easily made somewhere else.

Ventilation. COLONEL BELL, in reply to His Excellency the PRESIDENT, stated that the plans were ready with the exception of the part relating to the style of ventilation suggested by the Commander-in-Chief.

His EXCELLENCY the COMMANDER-IN-CHIEF, if he remembered rightly, thought Dr. Leith had recommended one square inch of surface for every 10 cubic feet of space. He (His Excellency) thought it should not be less than that.

DR. LEITH said that in recommending that proportion he had in view to meet such errors of construction as were seen in the Wanouree barracks, where there were openings in rough masonry about six inches by three. In these the friction would be great. But if the ventilating shafts were so wide as now proposed, and straight and smooth, a transverse sectional area of one square inch to every 20 cubic feet would be abundant.

His EXCELLENCY the COMMANDER-IN-CHIEF ventured to think that the recommendation Dr. Leith had first made would be safest, and he would suggest to His Excellency the President to order one square inch of opening for every 10 cubic feet of space.

DR. LEITH thought with supervision the smaller proportion would be sufficient, but there could be no sanitary objection to the larger ventilating outlet.

Fireplaces. COLONEL SCOTT said that the only question that now remained was as to the introduction of fireplaces in barracks.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said he had already discussed that point with **Dr. Leith**.

DR. LEITH said he thought the fireplaces should be introduced into the drying-rooms—rooms where the men's bedding and clothing could be dried without their being inoculated by the exhalations from the charcoal.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** suggested that fireplaces should be introduced into the barracks at Neemuch, Nussseerabad, Mhow, Ahmedabad, Deesa, Aboo, and Poorundhur. Colonel Phayre had also recommended Belgaum, but he (**His Excellency**) did not know the climate at Belgaum. He thought, however, it was never a disadvantage to have fireplaces.

HIS EXCELLENCY the **PRESIDENT** said that for the purposes of public works, Mhow, Neemuch, and Nussseerabad were under the Bengal Presidency.

DR. LEITH said he had had some conversation with Colonel Phayre about the introduction of fireplaces at Belgaum. He had recommended fireplaces for the drying-room, but the climate of Belgaum was not such as to require a fireplace.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** supposed that **Dr. Leith** did not consider fireplaces necessary at Ahmednuggur nor at Poona, and **Dr. Leith** replied that he did not.

COLONEL BELL asked **His Excellency's** reason for wishing the construction of fireplaces at Ahmedabad. Those who had lived there deprecated fires in the barracks. Fireplaces in drying-rooms were a very different thing. The climate was very dry.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said there was no harm in having them. In times of sickness or cholera they were useful.

MR. HADOW said there were a few places in Belgaum where fireplaces were, such as the Collector's house. The climate was damp and muggy during the rains.

In reply to **His Excellency** the **PRESIDENT**, **HIS EXCELLENCY** the **COMMANDER-IN-CHIEF** said that it would not be necessary to have fireplaces for the dormitories but only for the ground-floors. The rooms were small, so that one fireplace in the smaller of the rooms would be sufficient. There should perhaps be two in the large mess-rooms. There should be fireplaces in the reading-room, and in all rooms intended for day occupation. In the reading-rooms they would be very useful because they would dry the air. In each of the rooms of the ground-floor intended for any occupation there should be fireplaces in the proportion of one to the smaller rooms and two to the larger rooms.

DR. LEITH, in answer to **His Excellency** the **PRESIDENT**, said that the

proportion named by His Excellency would meet his views. He thought fireplaces were necessary when the climate was damp and in the colder stations. He had no objection to them on sanitary grounds. In fact there had been a necessity for them.

HIS EXCELLENCY the PRESIDENT gathered from the remarks of His Excellency the Commander-in-Chief and Dr. Leith that there should be fireplaces in fact at all hill stations.

COLONEL BELL asked whether the ventilating shafts suggested by the

Commander-in-Chief should go through the roof.
Ventilation.

Perhaps there would be no objection to the discharged air passing out from the shafts by the ridge ventilator. It would save the breaking up of the roof, which would be necessary if each shaft had a separate opening through the roof. There would be complaints besides during the monsoon of leakage, and frequent repairs would be called for. He thought it would be better if these ventilating shafts could be covered over by the roof itself, the expended air passing between the iron roof and the impervious ceiling designed to deaden the sound of rain and intercept the radiation of heat from the iron roof itself. The expended air would escape through the ridge ventilator.

HIS EXCELLENCY the COMMANDER-IN-CHIEF had no objection to that, and Dr. Leith also stated that he had no objection.

COLONEL BELL remarked that Colonel Scott had been inquiring of him

if the roofs were to be covered in with corrugated
Roofs. iron; if not, the airshafts must project through the roof, and it would be necessary to consider the question of a double covering.

HIS EXCELLENCY the PRESIDENT said there was no necessity of using corrugated iron if the Executive Engineer were fortunate enough to possess any better material. Corrugated iron, tiles, or slates might be used—anything that the sanction of the Commander-in-Chief could be obtained for. Arrangements could also be made as to the material for the erection of chimneys for the fireplaces. It was impossible to lay down any rule as to the use of bricks or stones, and at each place there must be a certain amount of judgment exercised. It was only necessary to ask His Excellency whether such and such a sort should be put on, and he would refer the matter to the Sanitary Commission. He (the President) himself believed that where it was possible an Executive Engineer would wish to get corrugated iron.

COLONEL BELL said that good tiles could not be got in Gujarat.

HIS EXCELLENCY the PRESIDENT repeated what he had formerly stated, that this new plan was an experiment, and was of course subject to modification. It would not be wise to order an iron roof until it was quite certain that such a roof was wanted.

COLONEL SCOTT said that an objection was entertained at some stations against corrugated iron on the ground that it might be blown off in heavy winds such as had recently happened.

HIS EXCELLENCY the PRESIDENT said that Colonel Scott referred to a storm which had been felt from the mouth of the Ganges to Kurrachee.

COLONEL BELL said he had not received instructions as to the site and disposal of the infantry barracks. Mr. Lee had been
 Infantry Barracks. a member of a committee on the subject, and he was able to point out that lately out-houses had been built to the existing temporary barracks at the very considerable cost of Rs. 45,000, and the site of the barracks being altered, would necessarily render these useless.

Several plans of the buildings having been submitted, HIS EXCELLENCY the COMMANDER-IN-CHIEF said the best site for the barracks should be taken without any other consideration.

COLONEL PHAYRE said that the plan would be sent to His Excellency on the following day, and then it would be sent to Government.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said there was one
 Ceilings. point which was not laid down in the direction for the barracks, and which was elsewhere accepted as a *sine qua non*: that was that every pent roof should have a ceiling—not a cloth, but a substantial ceiling.

COLONEL BELL was glad His Excellency had called attention to that point, for cloth ceilings were a great nuisance in many respects, as squirrels and birds got in between the roof and the ceiling and did great damage. If planked sloping ceilings instead of horizontal were used much of that would be obviated, and so much more space would be added to the contents of the room.

HIS EXCELLENCY the COMMANDER-IN-CHIEF replied that the only stipulation was, in the event of such a ceiling as Colonel Bell suggested being adopted, that means be taken to regulate the ventilation of the roof. A great number of people in this Presidency appeared to live under a very thin covering—a covering of merely two tiles, and the consequence was that the heat during the day was very great. Even though the general temperature was low, the heat of the sun penetrated through the roof and rendered it very hot inside. The advantages of climate were in that way abandoned in consequence of the roof. A ceiling was indispensable, but he had no objection to the ceiling proposed by Colonel Bell. The stratum of air between the ceiling and the roof is the best non-conductor of heat. An iron wire netting would exclude animals.

(b) *Deesa.*

The Quarter Master General's report in reference to the military requirements of Deesa station was read (see Appendix).

HIS EXCELLENCY the COMMANDER-IN-CHIEF had received a long communication from Colonel Arthur, who strongly recommended the advance of the station of Deesa to the borders of the Serohi district. That was a political consideration with Colonel Arthur, however, because no complaint had been made as to the unhealthiness of the station. There was a great deal in what Colonel Arthur said, but he (the Commander-in-Chief) was not inclined to go with him in the whole, but would leave the matter in the hands of His Excellency the President.

The HONOURABLE MR. ELLIS said that the district of country was a very large one, and there was a great extent of jungle, and there were very extensive ruins of old cities in the neighbourhood, and the ruins of old cities was never a very desirable location for British troops. In a military point of view the advantage gained by the change recommended by Colonel Arthur was only a distance of fifty or sixty miles. Troops at Deesa were probably as healthy as they would be in the new station suggested. If Deesa were abandoned as a main station, it would still be very desirable in a political point of view to retain some troops at Deesa in order to repress any tendency to disorder on the borders of the Runn. The mere presence of troops—the mere existence of a sufficient physical force in the neighbourhood to suppress disorder, exercised a moral force prestige also, if he might be allowed to use the expression.

In answer to His Excellency the PRESIDENT, HIS EXCELLENCY the COMMANDER-IN-CHIEF said there was no sanitary reason for the proposed change, and the reason given by Colonel Arthur was that the country had been settled by troops having been posted in it; and that the Serohi districts, which were in a disturbed state, would also be brought under the influence of the presence of troops. He was rather in favour of letting matters stand as they were.

HIS EXCELLENCY the PRESIDENT did not know whether there was any reason beyond that political reason, which would hardly in itself justify the change.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought there was one point which Colonel Arthur had put forward as a reason for the proposed change, and that was that the troops should be on the frontier where disturbance was likely to take place. He himself, however, would like the cantonment to be a little retired. If the country were disturbed one would be uneasy when the troops were away.

The HONOURABLE MR. ELLIS said that the disturbance which existed in the Serohi country was of that kind which would be best met by a strong cavalry patrol being posted in the country for a limited time until the country became quieter.

His EXCELLENCY the COMMANDER-IN-CHIEF considered that a good military communication was necessary between Deesa and Hyderabad, and also between Deesa and Neemuch. He wanted to send a party recently from the Neemuch road to the Deesa road, and he was told that they would be robbed and plundered. He thought the best possible cure for that was a good road.

The HONOURABLE MR. ELLIS remarked that all the district between Deesa and the desert was now completely settled.

His EXCELLENCY the PRESIDENT repeated there was no ground for delay, and it would not be well to hold their hand in reference to the present military requirements of the district when there was no reason for the proposed change.

Plans of the proposed buildings were submitted, in reference to which His EXCELLENCY the COMMANDER-IN-CHIEF said that Colonel Bell and himself had considered whether the barracks should be built on the site of those now existing, or whether a higher site should be selected. It appeared to him there were several disadvantages in the present site, and besides as they were building new barracks it was desirable to build them on the best site. Deesa was the confluence of a number of lines of drainage all converging to one point. It was a heart-breaking cantonment to go through. One had to plough one's way through deep sand at every step. There was a bazaar and ravine in the cantonment which it was impossible to keep clean. He thought it would be well to advance the station to the high ground and the racecourse, and with that view he had proposed that wells be dug and the ground examined. The result he did not know, as the proceedings had been interrupted for some time by the chief of the independent state refusing to permit any boring operations.

COLONEL PHAYRE said that he had received on the preceding day a communication on the same subject. It appeared that the proposed site of the new European barracks was part of a jagheer, and being on private property, the jagheerdar was afraid that by permitting borings to be made on his land he would be held to have given a tacit consent to the transfer of the land, which he said he was not ready to do. Colonel Arthur had asked the Commander-in-Chief if he

was to urge the matter to a termination, and the answer now given was that the operations should be at once begun.

HIS EXCELLENCY the COMMANDER-IN-CHIEF did not think anyone could ride through the country without regretting to see a station in the place where that of Deesa stood, as there was so much ground which would be much more airy and wholesome. The cavalry were really located in the bed of a nulla. It was a heavy journey to get to the other parts of the station from it.

HIS EXCELLENCY the PRESIDENT said that nothing could be done about the erection of the buildings, and the Commander-in-Chief, in assenting to His Excellency's remark, thought the settlement with the native chief should be urged as much as possible.

COLONEL BELL thought the plans could be proceeded with in all their details, because they would not be affected by the question of site in that part of the country, the soil being much the same in the vicinity. The Executive Engineer had been building extensive family-quarters at Deesa, the old barracks there being very old. They had been removed from Kaira originally, and the family quarters which the Executive Engineer had been building on the present site were completed.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought some useful purpose might be fulfilled by these buildings hereafter, Officers' Quarters. Commissariat or the like. He did not think there was any station so badly off for officers' quarters.

COLONEL BELL said the quarters had been commenced, but had been suspended on an order by the Government of India. When the 49th Regiment arrived the officers' bungalows were very full, and they were very badly off for accommodation.

COLONEL KENDALL, supplementing Colonel Bell's remark, said the quarters had been suspended by order of the Government of India, but were afterwards ordered to be resumed.

COLONEL BELL remembered that this was true, but they were again suspended pending the general question of site for barracks.

HIS EXCELLENCY the COMMANDER-IN-CHIEF did not know any place where there would be less loss in officers' quarters.

HIS EXCELLENCY the PRESIDENT said that action must be suspended until the question of site was settled.

HIS EXCELLENCY the COMMANDER-IN-CHIEF assented to His Excellency's opinion, and added that the question might be settled very soon. It would not require a long time to take borings. It was a great element of health to obtain a site affording an ample entourage.

(c) *Baroda.*

The Quarter Master General's report in regard to the requirements of Baroda was read (see Appendix).

COLONEL BELL, in submitting the plans of the required buildings, said that they were precisely the same as those of the Ahmedabad and Kirkee barracks. The Sanitary Commission had visited Baroda, and reported upon the best site. The old barracks were very objectionably built.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said the proper accommodation of troops at Baroda was a difficult question, the garrison being maintained there on grounds entirely apart from military considerations, and being guided by political considerations only.

HIS EXCELLENCY the PRESIDENT said that Government were under treaty engagement with the Guicowar to keep a certain force at Baroda. His Highness was very unwilling to allow it to be removed.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said Government had agreed that a certain force of artillery was to be at Baroda, and the question that had to be settled was where the best site for their barracks was to be obtained. Had the matter been open for discussion, he should have preferred a barrack which would have given the artillery possession of the railway station, but there were difficulties attending that plan.

HIS EXCELLENCY the PRESIDENT did not know that it had ever been definitely suggested before.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said the question was encumbered with a good many considerations regarding the present accommodation in the railway station. The proper plan would have been to have had a strong place within the station surmounted by a healthy barrack, which would have held the railway station. He did not know but the best course now was to leave the arrangements as they stood.

HIS EXCELLENCY the PRESIDENT asked if the question of fortifying the railway station could not be settled. He did not know that there was any political difficulty connected with the political possession of Baroda which could prevent the garrison being removed from its present barracks to the station.

COLONEL BELL, in submitting the plans, said that some years ago Colonel Wallace had asked for a road to connect the railway station with the military station of Baroda. A plan of the road had lately been laid before Government. A question which had to be settled was whether that road was to be regarded as a military work.

The HONOURABLE MR. ELLIS said the Guicowar wanted the railway station removed into the town. There had been at least three stations built at Baroda from time to time, and the present station was a miserable temporary shed.

HIS EXCELLENCY the PRESIDENT said there could be no reason why a barrack should not be built near the station, but it struck him the ground at the station would be found encumbered.

COLONEL BELL said the railway embankment at the new station was very high, and the site quite unsuitable for military purposes. He considered that the length of road from a new station to the cantonment should be regarded as a military road: it skirted the railway the whole way along.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that irrespective of the question of the comfort of the troops, if the station was not too far advanced, it would be as well to consider whether it could not be converted into a protective place.

COLONEL KENDALL said the works had been settled six months ago.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that all that was considered desirable for the protection of the railway station was that the outline should be so arranged that certain buildings should project so as to give a flank fire in the case of attack. Iron gates were also thought requisite so that if any disturbance broke out the Europeans could close their gates and save their rolling stock. Very little would suffice for the temporary protection of the station. The projecting buildings for the purposes of flank-firing should be loop-holed.

The HONOURABLE MR. ELLIS, in remarking that Government had refused to fortify the cutcherries throughout the country, said that the present suggestion of the Commander-in-Chief was one which could be adopted with the very slightest extra expense, and the suggestion should be urged on the Railway Company before the works at the Baroda Railway Station made too great progress.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that if the Railway Company neglected to take the simplest precautions for the protection of their own property that could be pointed out, the company could not come down upon the Government afterwards for compensation if the station should be burned. Perhaps so far as the comfort of the men was concerned it would be better to proceed with the barracks already ordered.

(d) *Mount Aboo.*

The Quarter Master General's report as regards this sanitarium was read.

COLONEL BELL reported that very bad accounts had been received of
 Damage by storms at Mount Aboo from the damage done by the rains
 Mount Aboo. there. The new block of family-quarters which had
 been nearly finished was blown almost entirely down. The Commander-in-
 Chief had recommended the Committee to decide upon a new site.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** stated that a letter
 had been received from the commanding officer there
 Family Quarters. to the effect that the site of the family-quarters was
 very low, and was always exposed to the influences of fever. As these had
 been reported to have been totally destroyed, it seemed desirable to ascertain
 if a proper site could not be obtained.

COLONEL BELL said there was no spot of ground which was not
 already occupied by barracks and their subsidiary buildings. In submitting
 the plans, he said there was nothing to be done at Aboo beyond the works
 already in progress and the alterations that required to be made.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said that a report
 had not yet been received of the autumn experience of the troops at Mount
 Aboo. In pursuance of the general plan of having one-third of the European
 troops at a hill station, he would, had he seen his way sufficiently clear, have
 recommended additional barracks for 200 men at Aboo instead of having
 them at Deesa.

COLONEL BELL was afraid there was not room.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** replied he would
 have had the barracks at Aboo on the ridge. It was
 Site of Barracks. a mistake to have them away down in the basin.

COLONEL BELL said new barracks had been built on a high ridge
 (which he pointed out in the plan), as it was found that the men always
 caught fever in the basin where the old temporary barracks had been.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said that on the
 summit of Aboo were numerous basins having the appearance of craters, and
 he would have had the barracks on the surrounding hills, and not in the
 basins. The troops complained at Aboo of being subject to fever. The whole
 of the pupils in the orphan school suffered from it at one time, and most of
 the residents also, although for the greater part of the year the climate was
 unobjectionable. He did think that the barracks would be better on the ridge,
 and had he seen his way sufficiently clear, he would have suggested consider-
 ation of the question of erecting barracks for 200 men on the lining of the
 crater on the wall which surrounds Aboo at a place called Oorea. That
 place was distant some six miles from the station, and the erection of the

barracks there would have entailed the construction of a carriage road up. In future, he thought, they must look to the further occupation of Aboo, and Further occupation of some of the difficulties now experienced as to coolies Aboo. would be overcome. If the ground at the foot of Aboo, which was now a nest of fever, was given out on lease rent free for a number of years to natives, who would bring it under cultivation, important advantages would be obtained, and the question was one worthy of consideration.

COLONEL BELL said it would be advantageous if the whole hill were placed under military occupation. The place where the celebrated temples were was one of the filthiest he had ever seen. The hill being in a foreign state, bullocks could not be killed upon it, nor was it allowable to take beef there.

HIS EXCELLENCY the COMMANDER-IN-CHIEF believed they got beef, however.

COLONEL BELL said it was smuggled up.

HIS EXCELLENCY the COMMANDER-IN-CHIEF remarked that was an obstacle which melted away in course of time.
Road required. A road was required to the hill at Aboo.

COLONEL BELL said that the question of the road had already been disposed of. It cost 24 rupees to carry a beer cask up the hill, but the cost of making the road would be so great as not to be repaid by the saving even of charges as heavy as the one he had instanced.

HIS EXCELLENCY the COMMANDER-IN-CHIEF was aware that the expense of a carriage road would be very great, but the saving in the expense of carriage annually would represent the interest of a large amount of capital. There could be a toll upon it. It seemed to him a great pity that the benefit of that climate should not be realised. It was wonderful as one passed that plain and saw an apparently little tuft on the horizon, to know what an amount of health and happiness it now produced.

HIS EXCELLENCY the PRESIDENT said that Captain Jopp might be asked to consider the question of a road up to Oorea.

COLONEL BELL said the construction of the road would be peculiarly difficult, and its mere survey would cost three or four lives.

(e) *Rest House at Surat.*

COLONEL BELL, who had been asked to report on the best site for a rest-house for troops in their journey from Bombay to Ahmedabad, stated that he had lately reported on the subject to Colonel Phayre (see Appendix). Captain Hancock and Mr. Mant, who had considered the question, had

pointed out a place about a mile and a half south of the Surat station where the ground would be very suitable. The embankment was only a foot or two high, and at the station itself near the Delhi Gate was from 10 to 17 feet high, and was close to the city, besides being so situated that any sea-breeze that reached it had to pass over the town. The proposed site at Surat was in a fork caused by two creeks which he believed were tidal creeks, and these would form an obstacle to the men getting into the city. The ground at the fork was high, and mango trees grew upon it; there was no rice cultivation there.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** did not know how the distances lay, but it would be an advantage to have a rest-house at Bulsar with the intention of having a sanitarium at Teethul.

COLONEL PIHAYRE said the distance was too great for that being accomplished, and he submitted plans of the district to **HIS EXCELLENCY**, who again remarked that a rest-house at Bulsar would appear to be a great convenience. If it was ultimately found that a second one was required one could be built also at Surat.

COLONEL BELL asked where the rest-house could be placed at Bulsar, and he remarked that its erection there would necessitate the making of a platform. The vicinity of the Bulsar railway station was unsuitable from filth and wet cultivation, and had been condemned by the Sanitary Commission.

The **HONOURABLE MR. ELLIS** said it had been condemned because the railway company had got into their possession a much larger piece of land than they could keep in a proper state. The filthy condition of the place could easily be remedied by taking a piece of the land away from them.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said a small rest-house would be indispensable at Bulsar if a sanitarium was to be erected at Teethul.

HIS EXCELLENCY the **PRESIDENT** thought it would be the best way to have a rest-house at Bulsar in connection with Teethul in the first instance. If it was found not to divide the journey between Bombay and Ahmedabad it could be put at a more convenient spot.

(f) *Proposed Seaside Sanitarium at Teethul.*

The Quarter Master General's report in reference to a sea-side Sanitarium at Teethul was read (see Appendix).

COLONEL BELL, in answer to **HIS EXCELLENCY** the **PRESIDENT**, said that he had not received definite instructions as to what the buildings were to be for.

COLONEL KENDALL did not think the Government of India had given their sanction to a sanitarium being erected at Teethul. It was a new military cantonment.

HIS EXCELLENCY the **PRESIDENT** said there was no difficulty regarding the erection of Teethul into a sanitarium so far as all present were concerned. There was no doubt that the building of a sanitarium at Teethul was a matter they would all wish to press upon the Government of India.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said he believed it was an accepted principle with the Government of India, that one-third of the British troops should be at hill stations, and if hill stations could not be got, stations on the seashore are our best substitutes in this Presidency. Indeed they are a very fortunate and beneficial addition to the hill sanitarium for many invalids and climate-worn men.

HIS EXCELLENCY the **PRESIDENT** said that the sanitarium at Teethul would be on the same plan as the buildings at Ahmedabad and Baroda, and Captain Mant should make sure that he had obtained all the requisite information to enable him to commence work when the sanitarium was sanctioned.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF**, in answer to **HIS EXCELLENCY** the **PRESIDENT**, said there was nothing special about Teethul, and that should be borne in mind while arranging the quarters.

DR. LEITH said the Sanitary Commission had had the plan of the quarters before it and had approved of the same. The position had been fixed upon, and the barracks were to be of the same kind as would suit for Ahmedabad.

(g) *Bombay.*

The Quarter Master General's report (see Appendix) stated, as regards Bombay, that there was emergent want of quarters for officers of two native infantry regiments to the extent of 24 units, agreeable to the orders of the Government of India dated 31st May 1866.

COLONEL DELISLE submitted plans of the buildings.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** stated that in the plan for these quarters, which had been approved, **Officers' Quarters.** the subalterns were allowed one room. He thought it, however, hardly sufficient in this climate to allow subalterns only one room.

HIS EXCELLENCY the **PRESIDENT** said that the question of officers' quarters was a very important question, and he read a letter from the Sanitary Commission on the subject of the accommodation proposed for officers.

HIS EXCELLENCY the COMMANDER-IN-CHIEF remarked that he thought the space mentioned insufficient, for the bedroom was too small for such a room. He also urged the necessity of the buildings having the whole width of ten feet for the verandas. It required very seriously to be considered how very little regard was given to the comfort and respectability of the officer compared with what was given to the subordinate officers. He thought sufficiency of space might be fairly demanded for an officer consistent with his rank. He agreed with the Sanitary Commission, and he thought their remarks were extremely forcibly and well put. The comparison was aptly drawn, and upon that comparison full accommodation should be given for the officer in comparison with the subordinate officers.

As to the rent of the units, COLONEL DeLISLE stated, in answer to the
 Rent. Commander-in-Chief, that the rent of the units was to be 70 rupees, and that the cost had been calculated so as to yield 7 per cent.

In answer to His Excellency the PRESIDENT, COLONEL DeLISLE stated that each block consisting of four would cost Rs. 44,000, or Rs. 11,000 each.

The mutual action of the Sanitary Commission and the Engineering Department.

HIS EXCELLENCY the PRESIDENT wished to take advantage of Dr. Leith's presence to ask Colonel Scott if there was now any difficulty about getting the criticism of the Sanitary Commission on the plans.

COLONEL SCOTT said there was not.

HIS EXCELLENCY the PRESIDENT further asked whether, in the event of any difficulty arising, he saw his way to getting it settled at once.

COLONEL SCOTT saw no difficulty.

HIS EXCELLENCY the PRESIDENT asked Dr. Leith if there was any difficulty where the Sanitary Commission saw a reason for differing with the Government of India generally about any points coming within the range of the Sanitary Commission's supervision in letting the Government and Superintending Engineers know what their views were in modification of what had been laid down by the Government of India. For instance a general plan might be received from the Government of India laying down a certain rule which the Sanitary Commission might think inapplicable to the Presidency of Bombay, or to particular parts of it. Would the Sanitary Commission in that case have any delicacy or plead any difficulty in stating what their opinion would be as to how the plan should be modified before it was sent out to the Executive Engineers to prepare their plans upon the general rule laid down by the Government of India?

DR. LEITH understood that plans sent out by the Government of India were sent for general guidance. Colonel Crommelin distinctly laid it down that no two or three plans could do for India, for even in his own presidency the plans differed so much that he could not prepare a general plan that would suit all localities. The Government of India approved "generally" of the plan they had sent out, and the plan had to be modified in its details according to the varying circumstances of the presidencies.

HIS EXCELLENCY the PRESIDENT said that the plan Colonel Bell had followed was to let Dr. Leith know either that he intended to adopt the plan sent by the Government of India for the general guidance of the Executive Officer, or that he proposed some modification. In the event of his proposing a modification, Colonel Bell, he believed, sent up a sketch plan. Was there any difficulty in dealing with such a modification on the standard plan of the Government of India?

DR. LEITH preferred seeing the sketch plans before the fair plans and the estimates were made. Colonel Bell always supplied him with a rough plan in the first instance. Colonel Dickenson on the other hand had applied for rules to guide him, but it would be better if in all cases the rough plan were laid before the Sanitary Commission, as that course would save much time to the Engineers themselves.

COLONEL DICKENSON said, in reply to His Excellency the PRESIDENT, that he saw no difficulty in sending sketch plans to the Sanitary Commission, and Colonel Scott also said that course could be easily followed.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that local circumstances had always to guide the Engineer in his arrangements. He observed, when visiting the Colaba barracks recently, that the floors were very damp. He did not know whether the engineers had contemplated any arrangement with regard to the floors, or whether they had determined how high to raise them above the surface of the ground. In going through the buildings he observed that the floors, particularly that of the dépôt hospital, were absolutely wet from being almost at the sea level.

DR. LEITH said that so long as stone floors were used in Bombay the floors would always be wet during the monsoon.

HIS EXCELLENCY the COMMANDER-IN-CHIEF remarked that the building to which he had more particularly made reference was an unoccupied building—the dépôt hospital.

COLONEL BELL said there was always a moisture in stone during wet weather. He had seen the moisture at the steps of the pay-office at Bombay so great that it appeared as if the steps had been washed with water.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that the floor of the Colaba barracks ought to be raised ; and DR. LEITH added that it ought to be raised on arches. He thought the Commission had recommended the spot on which the family-quarters were to stand, and that they should have very high plinths. In the last alteration on the plans these recommendations had been carried out.

HIS EXCELLENCY the PRESIDENT remarked that to a certain height up Malabar Hill, and to the height of 80 feet above the sea at Bandora, the quantity of moisture was so great that in the bottom of one of the common hall chairs a pool of water would collect, and if one looked when the sun was low towards the shore one might see to the height of 100 feet above the level of the sea a continual driving of salt spray. People within reach of it did not appear to suffer from rheumatism ; perhaps there was something on the salt air which prevented the dampness from affecting them. He thought, however, that the floors of the barrack should be raised.

DR. LEITH said that in the Fort St. George barracks the upper floors were too damp during the rains, in consequence of the deposit of moisture on the stone. The houses near the sea became encrusted with salt. It was a question whether the flooring should not be of wood in all such cases. It would be the only plan of preventing the moisture from taking effect.

The Conference then adjourned until Friday, the 21st September.

FOURTH MEETING—FRIDAY, 21ST SEPTEMBER 1866.

III.—PUBLIC WORKS IN THE SOUTHERN MARATHA COUNTRY.

The Conference met again on Friday, 21st September, His Excellency Sir BARTLE FRERE, G.C.S.I. and K.C.B., presiding.

I.—PUBLIC WORKS IN THE STATE OF BAREA (*now under the superintendence of the Political Agent during the minority of the Raja*).

HIS EXCELLENCY the PRESIDENT stated that Colonel Anderson, Political Agent in the Southern Maratha Country, having occasion to leave for Kolapoor, would read a paper on the public works in the State of Barea, of the Rewa Kanta, of which he lately had charge.

LIEUT. COLONEL ANDERSON read the following paper regarding public works in the Barea State :—

1. In 1825 it was decided by the Bombay Government that the accumulations of the Barea tribute, which had been imposed on the State under peculiar circumstances, should be expended for the benefit of that territory and its vicinity. This course was highly approved of by the Home Government, and in their Despatch No. 2 of 16th January 1856 they directed attention to the wants of the district in respect to roads, wells, tanks, surveys, and education. The tribute is Rs. 12,000 a year, and on the 1st June last the accumulations amounted in round numbers to Government Rs. 2,17,000. Under the impression that the tribute should be considered a local fund, I submitted proposals for its expenditure; but on a reference being made to the Government of India it was ruled that the tribute should be credited to the general revenues of the State, and that any expenditure sanctioned for the Barea territory should be made chargeable to the Imperial Treasury. Unless however, a separate provision is made for this Barea expenditure, the effect of this order, so far as I can see, will be that the grant for works in the British districts of the Bombay Presidency will be diminished in proportion. I am therefore respectfully of opinion that the money should be given from the general revenues and not from the grant to Bombay.

2. The works already proposed involve an aggregate expenditure of Rs. 1,82,100, and are as follows :—

1.—The Barea portion of the Godra and Dohud road, the principal line of communication between Central India and Gujarat, in all 25 miles, at Rs. 4,000 a mile. The Government of India have intimated their approval of this expenditure	Rs. 1,00,000
2.—Dhurumsalas, police stations, and wells at the three principal halting-places of Peeplod, Hutheedra, and Walloondee on the above road. Orders in respect to this expenditure have not been received	,, 20,100
3.—Improving and clearing the most difficult portions of existing cart-tracks in Barea. No order received	,, 10,000
4.—Branch road from Peeplod to town of Barea, eight miles, at Rs. 4,000 a mile. No orders received..	,, 32,000
5.—A village boundary survey of Barea to be carried out by the Survey Department in conjunction with Political Agent. Major Prescott informs me that since I left the Rewa Kanta sanction for this work has been received.....	,, 20,000
	<hr/>
Total proposed expenditure	Rs. 1,82,100
Remaining unexpended.....	,, 34,900
	<hr/>
Total tribute accumulated	Rs. 2,17,000

3. As the Barea territory is mixed up with the Punch Mahals, it has been proposed that these works, with the exception of the village boundary survey, should be carried out under the superintendence of the Executive Engineer of the latter district, and that he should receive from the tribute an addition to his salary of five rupees per diem on that account. The district is an unhealthy one, and the duty will bring a considerable increase of work.

4. A sum of Baroda Rs. 80,000 is also immediately available from the funds of the State for expenditure on local works. A list of those most urgently required was given in my letter to Government, No. 152 of 10th March 1866, and Government in their Resolution thereon, No. 1615 of 9th June, were pleased to approve of my suggestions. Arrangements have been made with Mr. Little, the Executive Engineer of the Punch Mahals, for the

proper prosecution of the works. Plans and estimates have been furnished by that officer for a jail at Barea and approved of. The estimated cost is Rs. 12,297. A plan for a school-house at Barea has also been furnished by Lieutenant Mant, Executive Engineer, Surat, at an estimated cost of Rs. 5,632, part of which will be paid by the inhabitants. These buildings will be commenced on the opening of the season. Other works will be undertaken after due inquiry. A large expenditure might be very usefully made on tanks and wells.

G. S. A. ANDERSON, Lieut. Colonel,
Late Acting Political Agent Rewa Kanta.

Poona, 17th September 1866.

NOTE.—Supplementary Budget estimates might at once be submitted for sanction to the Government of India, with reference to the instructions contained in their letter No. 399 of 21st April 1866, above referred to, in respect to works 2 and 3. Before works 1 and 4 can be commenced probably surveys must be made.

The HONOURABLE MR. ELLIS said that a discussion had taken place about this Barea treaty a good many years ago, and the Court of Directors, in passing final orders, stated explicitly that the collection of tribute was justifiable only on the ground of the proceeds being spent on the defence of the country. When they had provided for the defence of the country, the Directors so far modified the orders as to say that the balance remaining after providing for the defence of the country was to be spent in providing works for the benefit of the district. That went on for many years, and the tribute had been regularly paid, but since 1849 nothing whatever had been defrayed for the State, though Government had been receiving Rs. 12,000 annually. When the police of the Punch Mahals was about to be reorganised, a portion of the police was engaged as an escort to the Political Agent in Rewa Kanta, and it was not fair to charge the Punch Mahal revenue with the cost of maintaining this escort and another guard which was outside the Punch Mahals. The Barea tribute amounts were therefore examined. It was found that there was a surplus, and on hunting up that surplus it was also found that it ought to have been used for the prosecution of works of improvement. Application was made to the Government of India to be permitted to begin with an expenditure on such works of one lakh of rupees. The accounts which had been made up showed that there were Rs. 2,17,000 of surplus. The lakh applied for was to be expended on making that piece of road which passed through the Barea State between Godra and Dohud. There was nothing in that part of the country so civilising as roads, and that had been already proved by the roads which passed through the jungles. The water supply was bad, and by putting

dhurumsalas, wells, and police stations all along the road, Government did the very best thing that could be done to carry out the intention originally stated for spending this money. But the Government of India refused to give the lakh which had been applied for, saying that they were bound, with the Rs. 12,000 of annual revenue, to give a general support to the State, and to provide generally in the general arrangements of Government for the police and the improvement of the State. Therefore any sum required for the improvement of the Barca State was to be charged on the Imperial Treasury, which of course meant that the Budget of this Presidency should be reduced. The result was that nothing was done for the Barca State, as no Secretary of Government would allow anything to be done for it, and would not allow it to take precedence of the numerous works required in British territory.

The HONOURABLE MR. ELLIS, in reply to the Commander-in-Chief, who asked where the Rs. 2,17,000 he referred to were, said the amount had been credited to the Government of India, and nobody knew anything about the money until inquiry was made into the reorganisation of the police.

LIEUT. COLONEL ANDERSON stated that the Home Government had ordered it to be spent on roads, wells, tanks, surveys, and education. The orders were all clear and distinct on the subject, but as soon as the tribute found its way into the Imperial treasury the difficulty was to get it out again. He further stated, in reply to the Commander-in-Chief, that the order had been quoted in a representation which had been made to the Government of India on the subject.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought another clear representation should be made. He had an impression that the former representation might not have been quite understood. The territory was not contemplated in the budget arrangements.

The HONOURABLE MR. ELLIS agreed with the Commander-in-Chief that the territory was not at all contemplated in the budget arrangements, but if work was to be done in this district, and the cost defrayed from the budget, the outlay would form a clear deduction from the budget. It either acted in that way, or nothing was done whatever to the district, because, as he had already said, the little works of this district gave way to great works more immediately pressing in the Bombay territory. In reply to His Excellency the PRESIDENT, Mr. Ellis stated that the balances in the Punch Mahals arose from transit duties.

HIS EXCELLENCY the PRESIDENT thought that if a clear explanation were made the money would be granted.

LIEUT. COLONEL ANDERSON said that the Government of India had suggested that Supplementary Budgets should be submitted.

The HONOURABLE MR. ELLIS said that Colonel Bell might be requested to send in detailed plans of the police stations, wells, and dhurumsalas, the plans for the police stations being standard plans, which, he thought, would be better than sending in detailed plans of the road, as the road would take a very long time to survey. The sites of the others were fixed, and every officer would know where they were to be. These buildings and wells would be of use afterwards.

LIEUT. COLONEL ANDERSON, in reference to the arrangements made with Mr. Little for the prosecution of certain works to be undertaken from the State funds, said that no orders had been received by Mr. Little for their prosecution, and perhaps there might be some difficulty in the Public Works Department unless Mr. Little received distinct orders. He himself had arranged with Mr. Little as to the prosecution of the works, but plans and estimates must be first submitted. Only two had been submitted as yet. One of them was for a school-house at Barea, of which the inhabitants had agreed to pay a part, and the other was for a jail there. He had prepared a very long list of works which would be looked at by Mr. Little, and plans would be submitted by him according to the instructions received. About Rs. 80,000 of the Barea money would be available for this year, and afterwards a surplus of Rs. 40,000 would be available yearly.

II.—PUBLIC WORKS IN THE SOUTHERN MARATHA COUNTRY STATES.

LIEUT. COLONEL ANDERSON then read the following paper regarding public works required and in progress in the Southern Maratha Country States :—

In reference to the Jumkhundee work, LIEUT. COLONEL ANDERSON said that the Chief himself had agreed to carry out this work, but he thought it would be advisable if the superintendence were undertaken by the Public Works Department, as the Chief might make a mess of it. The plans had been prepared in the Public Works Department by the advice of Government.

COLONEL KENDALL said the plans had never come up to him, and he had never seen them. They might have been prepared by the Collector and the Executive Engineer together.

LIEUT. COLONEL SCOTT said that though such plans should always be submitted to the Superintending Engineer, they had not reached him.

HIS EXCELLENCY the PRESIDENT remarked that the plans had been prepared extra-officially.

LIEUT. COLONEL ANDERSON said that the Chief applied to be assisted by the advice of an Engineer officer, and Captain Malcolmson was sent to look at the locality and prepare the plans. As the Chief supplied the money,

they were not submitted to the Public Works Department through the Superintending Engineer. It was merely a matter between the Chief and the Political Agent.

In reply to a question from His Excellency the PRESIDENT, who asked whether the matter should not be left to the Chief himself in the way Lieut. Colonel Anderson had hinted at, His EXCELLENCY the COMMANDER-IN-CHIEF said that Government was to some extent committed to see that the work was successfully carried out, since a Government Engineer had been consulted about it.

HIS EXCELLENCY the PRESIDENT suggested that it might be the best course to ask the Superintending Engineer to obtain the plans.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought that a certain amount should be fixed, and that the plans of all works above that amount should be sent to the Superintending Engineer.

COLONEL BELL said that a resolution had been already passed to the effect that all works costing above Rs. 1,000 should be submitted to the Superintending Engineer.

The HONOURABLE MR. ERSKINE suggested that in reference to this matter Government did not need to go beyond the Superintending Engineer.

COLONEL KENDALL said that all works referred to any of the Government Engineers were considered public works, and Captain Malcolmson could not undertake the charge of public works without bringing the same into his accounts in due form. Any other course was against the orders of the department.

HIS EXCELLENCY the PRESIDENT thought the Commander-in-Chief's view was, that where officers were allowed to assist in the construction of public works in another State, Government was bound to take the same precautions as it took with its own money, and see that a Chief's money was properly spent.

The HONOURABLE MR. ELLIS would discountenance very much any interference with officers making use of their skill and scientific knowledge by insisting upon them sending in their plans to the Superintending Engineer.

HIS EXCELLENCY the COMMANDER-IN-CHIEF would have agreed with Mr. Ellis provided Government could always depend upon the skill and knowledge of the local officer, in which case it would not be necessary to carry it further. It is quite possible, however, that such an officer might let the Chief in for a great sum of money.

The HONOURABLE MR. ELLIS said it was very discouraging to officers if they were bound down in all the trammels of official routine unconnected

with their own departments. If it were a difficult work the Political Agent would himself see cause to apply to the Superintending Engineer. If the plans went forward through the usual channels, and the work were executed under the supervision of the department, it was bound in all those fetters which trammelled similar undertakings. If such a course were followed in the present instance the work might be going forward in the budget two years hence.

In answer to Colonel Bell, **LIEUT. COLONEL ANDERSON** said that the Chiefs in the district where he was Political Agent had the complete disposal of their funds. Their funds were not funds of the Government of India at all. If they approved of the works the only assistance he would render would be assistance in reference to engineering details which they could not properly arrange for themselves. The Chiefs were generally men of limited incomes, and could not organise a proper engineering establishment.

In answer to His Excellency the **PRESIDENT**, who asked Lieut. Colonel Anderson what rule he would lay down to himself in cases going beyond the ordinary routine of the local engineer's duty, as for instance a water supply project, **LIEUT. COLONEL ANDERSON** said that he would feel himself called upon to consult Government Engineers in all projects of difficulty.

HIS EXCELLENCY the **PRESIDENT** asked the Commander-in-Chief if he did not think it would be well if the Political Agent had power to call for the opinion of the Superintending Engineer.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** replied it depended a great deal upon the Political officer. It would be a safe rule to say that all works of a certain nature involving any scientific knowledge and beyond a certain sum should invariably go to the Superintending Engineer for opinion. A time might be fixed for the plan to be returned. Considering how many occasions there are when it was necessary to entrust charge to officers who had not been regularly trained, cases might arise in which the interests of the Chiefs might suffer if costly or difficult works were not submitted in the first instance to the Superintending Engineer. The Chief, moreover, would consider that he had a guarantee from the British Government that the work would be properly designed when he applied to a Government Engineer.

The **HONOURABLE MR. ELLIS** was quite willing to agree to the principle suggested by the Commander-in-Chief if the limit within which it was not necessary to submit plans to the Superintending Engineer was a sufficiently high one, say Rs. 10,000.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** thought a limit of Rs. 10,000 would be a very fair sum.

The **HONOURABLE MR. ELLIS** would also leave it to the discretion of a Political Agent to refer to the Superintending Engineer whenever he considered

it necessary to have the opinion of men of higher scientific knowledge or attainments.

This arrangement was accordingly agreed to.

III.—PUBLIC WORKS IN THE KOLAPOOR STATE.

LIEUT. COLONEL ANDERSON read the following paper on the subject of public works in the Kolapoor State:—

1. At an early period of the Conference His Excellency the Governor did me the honour of consulting me about a bridge over the Paunchgunga near Kolapoor. Since then I have had an opportunity of talking with the late Political Agent, Mr. Havelock, on the subject, and Major Oldfield has put me in possession of information relating to the financial condition of the State. I therefore now beg to submit my opinion that although it might perhaps be difficult for the State to pay the entire cost of a stone bridge, which is estimated at Rs. 1,71,000 to Rs. 1,84,000, it might very well bear the expense of an iron bridge, if one can be built for a lakh of rupees or thereabouts. It will also probably be found that some light description of iron bridge is best suited for the locality. In the event of the Kolapoor State bearing the whole expense, the amount should be recovered by such annual instalments as may be convenient, with reference to the current expenditure on other important public works, and the surplus funds available. The State should also be allowed to establish a toll, and this toll, once established, should not be abolished without its consent.

2. The other principal works connected with Kolapoor, to which, after consultation with Mr. Havelock, I think early attention should be given, are as follows.

3. Repairs to the road from Kolapoor to the Phonda Ghaut by Ghybee Khind. In April last Mr. Havelock arranged that a sum of Rs. 6,000 should be made available for this work, and he informed the Superintending Engineer S. D. that on receipt of an estimate of expenditure he would consult with the Durbar as to advancing further sums if required. The work can therefore at once be proceeded with on the sum already sanctioned, and on receipt of the estimate called for, any further steps that may be necessary will be taken by the Political Agent.

4. Road from Kolapoor to the town of Bhogaum, the route so far being the same both for the Kajeerda and Anookoora ghauts. The choice of a road from Kolapoor to the ports of Rajapoor and Vizidroog lies between these two ghauts, and the road to Bhogaum might therefore be commenced at once, and continued hereafter to whichever ghaut may be finally selected.

5. The present roads from Kolapoor to Mulkaipoor and Boura require attention, but they labour under the disadvantage that they terminate in

ghauts which are not fit for carts. They are therefore, as regards cart traffic, of no great use.

6. The road from Kolapoor to Bhodurghur also requires attention.

7. Also the Kolapoor section of the Kolapoor and Bejapoor road.

8. Road from Parpoolee Ghaut, via Ajra, to Sunkeshwur or to the bridge at Hebhal to the south of the Hurnkassée river. This would be an important feeder to the ghaut. Government, in their Resolution No. 2179 of 11th July 1863, ordered that plans and estimates of this line should be submitted, and the Political Agent, Mr. Havelock, after consulting His Highness the late Raja, reported, in his letter to Government No. 408 of 25th July 1863, that half of the expenses of constructing the Kolapoor portion of the road might be borne by Kolapoor; that the State of Eechul Kurunjee, which is feudatory to Kolapoor, might be called upon to pay one-fourth, and that the remaining fourth might be paid from the ghaut tolls within the principality. This work might therefore be proceeded with as soon as the necessary plans and estimates have been prepared and approved of. The best and most direct line to the ghaut for traffic coming from the eastward is probably the one leading from the Hebhal bridge. Should this line be adopted, Gud-Inglaj and other places might, if considered desirable, be connected with it by a branch road.

9. It is an object of importance to increase the water supply of the town of Kolapoor. This might probably best be done from the direction of the Happy Valley, about five miles distant. Lieutenant Williams might at his leisure inspect the ground, and, in communication with the Political Agent, submit some plan for effecting this desirable object, if there are no great difficulties in the way.

10. I beg strongly to recommend that Kolapoor and the Jahageer State with the Government works connected with them, be formed into a separate Executive Engineer's charge under the Public Works Department. A great many important works are now in progress, and others are under consideration. They are not connected with Belgaum, and cannot be properly superintended from that office. Having to refer everything to Belgaum, besides, is the cause of much inconvenience—great delays in carrying out important works are thereby caused, and correspondence takes the place of action. In native States especially time is of the utmost importance, as their circumstances are continually changing, and what can easily be effected by the Political officer at one season, may become a matter of extreme difficulty to carry out at another time if allowed to lie over until an officer whose hands are full of other work can conveniently take it up.

G. S. A. ANDERSON, Lieut. Colonel,
Political Agent, Kolapoor.

Poona, 20th September 1866.

In reference to the suggestion in the foregoing paper, that a toll should be placed on the bridge proposed to be built over the Punch Gunga river on the Poona and Hurryhur road, His EXCELLENCY the COMMANDER-IN-CHIEF remarked there were great objections to a toll on open roads. It remained optional to the traveller to ride across the country, or to take a boat and cross the river. A toll multiplied the chances of extortion.

In reference to the repairs suggested to be made on the road from Kolapoor to the Phonda Ghaut by Ghybee Khind, LIEUT. COLONEL ANDERSON stated that the sum of Rs. 6,000, referred to as sufficient to set the work a-going, was immediately available, and that any further amount required would be forthcoming.

HIS EXCELLENCY the PRESIDENT stated that Colonel Phayre had made a ghaut some years ago, and it was a very valuable one. It had not, however, been finished. It was in good order now, but the access from the sea to it was in a state of disrepair, and nothing had been done to it from Kolapoor to the top of the ghaut.

The HONOURABLE MR. ELLIS said that Mr. Woodhouse, the Executive Engineer of the district, had just mentioned to him that the portion of his road would be finished by the 1st of January. He (Mr. Ellis) thought Rs. 6,000 was as much as Colonel Anderson could spend without further information.

LIEUT. COLONEL ANDERSON said it was, and he added that that sum had been sanctioned without any regular estimate.

The HONOURABLE MR. ELLIS suggested that the Rs. 6,000 should be expended on that part of the road from the head of the ghaut to the point where the two roads meet, from Nepanee and Kolapoor.

In reference to the proposed road from Kolapoor to the town of Bhogaum, LIEUT. COLONEL ANDERSON stated that the great difficulty appeared to be the selection of a ghaut. It was clear that some ghaut was wanted in addition to the ghauts already made, but he was not himself prepared to give an opinion as to where the best ghaut could be made. He was quite ready to provide the funds for any ghaut from Kolapoor to Rajapoor and Vizidroog which might be selected as the best.

The HONOURABLE MR. ELLIS said that Mr. Crawford, the present Municipal Commissioner of Bombay, had been long in charge of that district of the Konkan, and was very much in favour of a ghaut road from Anooskoora to Rajapoor.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought any ghaut which was really made was the best.

LIEUT. COLONEL ANDERSON said any ghaut would be useful, but

the State could not provide two ghauts, and it was therefore desirable to have the very best ghaut they could get.

HIS EXCELLENCY the COMMANDER-IN-CHIEF would rather take the second best now than wait too long for the best.

LIEUT. COLONEL ANDERSON said there was a great deal of traffic on the various ghauts. The general opinion was all in favour of one ghaut at one time, and now they were all in favour of another.

HIS EXCELLENCY the PRESIDENT thought with the Commander-in-Chief that the ghaut which was made was the best. There were very few places within twenty or thirty miles along this coast where there was not a very good creek, a very good landing and shipping place, and every one of these creeks had got its ghaut. The question which had so long kept back the making of a ghaut road was whether it was not possible to find a better one. He dared say some of them had seen a paper which was drawn up by Mr. Connon, who was Magistrate of Malabar, and which made a good deal of stir some years ago. His country was in the same state as the district now under consideration, having a number of tolerable fair-weather ports and a great number of ghauts. He made the most careful inquiries at each ghaut, and he proved that as long as the ghauts were not brought within six miles of each other there would be no interference with the traffic of the respective ghauts. In the instance now under consideration, as long as the ghaut selected had, as would be the case, sixteen miles north and south of it without a complete ghaut, there was no fear of doing any injury to any other ghauts.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said he had based his remark, that the ghaut that was made was the best ghaut, upon the fact that there were so many opinions equally balanced that it was clear one would not go far wrong in choosing either of the ghauts about which there was a difference of opinion.

HIS EXCELLENCY the PRESIDENT corroborated the Commander-in-Chief by remarking that in a case like the present the money would not be spent on either ghaut to much disadvantage.

COLONEL PHAYRE said the ghaut to the town of Rajapoor by the Boura Ghaut was the favourite one.

LIEUT. COLONEL ANDERSON replied that the objection to the Boura Ghaut was that it was too near the Phonda Ghaut.

MR. WOODHOUSE said that the Boura Ghaut was very close to the Kajeerda Ghaut, being only four miles distant.

LIEUT. COLONEL SCOTT said that in reference to the Kajeerda Ghaut, Mr. Woodhouse had made an estimate showing that it would cost Rs. 90,000

per mile. It was thus a very expensive ghaut. The Parpoolee Ghaut cost Rs. 87,000 per mile, which was also a very large sum. The cost of the other ghauts would be Rs. 25,000.

MR. WOODHOUSE said that the estimated cost of the Kujcerda Ghaut was Rs. 3,80,000 for six miles.

In answer to His Excellency the PRESIDENT, LIEUT. COLONEL SCOTT thought that an inspection of the various ghauts should be made in the neighbourhood of the probable line of road.

In reference to the road from Parpoolee Ghaut *via* Ajra to Sunkeshwur, or to the bridge at Hebhal to the south of the Hurnkassee river, LIEUT. COLONEL ANDERSON stated that Government had sanctioned a survey of this line.

COLONEL PHAYRE said that this would prove a very useful feeder to the Parpoolee Ghaut road.

In reply to His Excellency the Commander-in-Chief, MR. CRAWFORD, Municipal Commissioner of Bombay, said that Viziadroog had a very large harbour in which the *Great Eastern* could lie during the monsoon.

The HONOURABLE MR. ELLIS stated that one thing should be done immediately, and that was to complete the Phonda Ghaut.

HIS EXCELLENCY the PRESIDENT, after inquiring of Lieut. Colonel Anderson, said that that gentleman would be fully occupied during the first season in improving the approach to the Phonda Ghaut, and also in making an access to the Parpoolee Ghaut; but that Mr. Woodhouse would go on looking at some of the other ghauts, and get the same sort of information about them which he had got about the Boura Ghaut. In the meantime by the next hot weather he would be able to make up his own mind which of the ghauts was upon the whole the best with the view of getting down to the good port below.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that if Lieut. Colonel Anderson had not the money to spend at present the time would not be lost in making inquiries.

HIS EXCELLENCY the PRESIDENT said that Lieut. Colonel Anderson had occupation for all the money the State would be likely to spend at present.

HIS EXCELLENCY the COMMANDER-IN-CHIEF did not think the question of the difference of a hundred or two hundred feet in the height of a road was a question of any great consequence. It was the points of departure that required to be carefully selected.

HIS EXCELLENCY the PRESIDENT thought that Lieut. Colonel Anderson, with the assistance of Mr. Nairne and Mr. Crawford, might be able to settle which of the ghauts was the better, so as to enable Mr. Woodhouse to prepare the project. While Lieut. Colonel Anderson was making inquiries in the hot weather, Mr. Woodhouse could also be making his.

LIEUT. COLONEL ANDERSON expressed his readiness to adopt His Excellency's suggestion, and remarked that the road from the Parpoolee Ghaut *via* Ajra to Sunkeshwur, which would bring the south of the Kolapoor territory into communication with the port of Vingorla and the State of Sawunt Waree, might be undertaken. It had received a general sanction several years ago.

HIS EXCELLENCY the PRESIDENT said that it might.

In reference to the suggestion in Lieut. Colonel Anderson's memorandum that the Kolapoor and the Jahageer States, with the Government works connected therewith, be formed into a separate Executive Engineer's charge under the Public Works Department, LIEUT. COLONEL ANDERSON, in answer to His Excellency the PRESIDENT, who asked if the State would contribute towards defraying the cost of the establishment, replied that he thought the Kolapoor State might defray a portion of this cost. The only difference that his proposal would introduce was that the establishment for the State would be independent of Belgaum. Its connection with Belgaum caused very great delay, as the Executive Engineer at Belgaum had so much to do that he had no time to look after the works of other people.

HIS EXCELLENCY the PRESIDENT said that the proposal would be considered by Government.

IV.—PUBLIC WORKS IN THE ISLAND OF BOMBAY.

COLONEL DELISLE, Consulting Engineer to Government, read the following memorandum relating to the progress of Public Works in the Island of Bombay for 1865-66 :—

I.—HARBOUR DEFENCES.

But little has been done in the way of construction to the Batteries this year, as the works have been suspended pending final decision as to the nature of the defences to be adopted. This has been rendered necessary by the marvellous effects produced by the new ordnance constructed in England by Sir W. Armstrong, Mr. Whitworth, and others. A memorandum briefly describing the state of the works and the proposed alterations has been submitted to His Excellency the Commander-in-Chief, whose decision on the subject is expected when the plans procured by Colonel Kennedy from the War Office have been received and examined. The expenditure during the year is chiefly in adjustment of accounts due to former years. The following minor works have been carried on during the year :—

Cross Island.—At Cross Island the expenditure has been Rs. 3,724 upon a Shell-filling Room and Serjeant's quarters.

Colaba.—At Colaba Point Shell-filling Room and Magazine Rs.

Palisade	13,631
Serjeant's and Lascars' quarters	2,516
Maintenance	283

Workshops.—The most important work, however, has been the removal of the Defence Workshops from Mazagon to the Cap Manufactory, as the former site is required for the goods station of the G. I. P. Railway. It has been necessary to commence reclaiming a space of about 3 acres, and the formation of a pier and gridiron, boat slip, and patent slip for the repairs of the barges belonging to the department. The progress made up to the 1st May has been 263 feet of pier and 2,593 square yards of reclamation, and the partial construction of the gridiron and slips. Besides the above, progress has been made in the removal of the stores and materials from the old to the new workshops, and in the fitting up of the latter a part of the dressed stone has been used in enclosing the workyard. The removal of the stores will be completed by the 1st October; but it is probable that there will still be some of the valuable khaukees and rubble of the reclamation walls to carry away. This will, however, be pushed on as rapidly as possible. Expenditure Rs. 82,503.

Custom House.—At the Custom House the parapets of the old battery have been removed at a cost of Rs. 699, and the ground levelled for Rs. 18.

Saddlebuck Barges.—Twelve of these ordered for the filling-in of the Middle Ground have been received, and six are under construction. The first one launched was badly put together, and sunk twenty-four hours afterwards. It was raised by Mr. Murphy in a very creditable manner, and has been since repaired and relaunched. It is now under trial, and the result will be reported shortly. It has been proposed to transfer these barges to the reclamation works as they are too late for the middle ground works. One barge is to be completed without the planking and double plating on the saddles. If this is found to answer, the others will be finished in the same manner, and the five too far advanced for alteration will be chiefly used for stone work. The expenditure to 1st May is Rs. 31,010.

PROPOSED WORKS FOR CURRENT YEAR.

Oyster Rock.—This battery must await the final decision as to designs.

Middle Ground.—Sections of the filling in the foundations will be taken after the monsoon, and the result will show where additional material is required to complete the rubble to a regular oval figure. This should be done in the

approaching fair season, and the foundation will then be ready for the masonry works when finally determined.

Cross Island.—The following buildings to be completed :—Shell-filling Room and Serjeant's quarters, Rs. 5,011.

Colaba Point.—The following buildings require completion :—

Shell-filling Room and Magazine Palisade.....	Rs. 4,379
Serjeant's and Lascars' quarters	„ 3,019

Workshops.—It is of great importance that this work should if possible be completed during the temporary suspension of the large batteries, so that nothing may interfere afterwards with the prosecution of those works. Of the allotment for this year, Rs. 60,766 have been expended up to date in reclamation and removal of the materials from the old workshops, and only Rupees 45,228 remain. This amount will be insufficient, and a transfer from the Oyster Rock allotment is desirable.

The following works remain to be completed :—

Erection of iron sheds for shops.

Extension of pier.

Patent slip.

Boat slip.

Fitting up machinery.

Boat shed and office.

Completion of removal of stores and useful stores from old shops.

Another lakh would probably suffice, but more should be given if required.

Saddleback Barges.—The sum expended in the current year up to the 1st August is Rs. 37,831, leaving Rs. 61,190 for future expenditure.

Hornby Battery.—A proposition has been made to extend the Custom House Piers and form a small basin in front of the Hornby Battery, which will then be completely masked. The proposed alterations of this work should therefore be suspended for the present.

Proposed alterations to Batteries.—The proposed alterations to the Batteries are shortly these :—

1st.—A considerable reduction on the number of 110-pounders.

2nd.—The introduction of cupola turrets armed with 300-pounders, or 600-pounders preferable, if procurable.

3rd.—Iron-plated parapets for the smaller guns.

4th.—Bomb-proof cover of iron, or other materials.

Auxiliary Statements.—Statements of expenditure and progress, and of prospective requirements for 1867-68, are appended.

TOTAL EXPENDITURE.

The following memorandum, showing the total expenditure on the following works connected with the Defences up to 1st May 1866, was handed in to Congress :—

Oyster Rock Battery.....	10,85,392
Middle Ground Battery	17,35,074
Cross Island Battery	1,67,981
Malabar Point Battery	17,826
Butcher's Island Battery	21,138
Colaba Point Battery.....	25,349
Magazine Custom House Pier	985
Magazine Apollo Pier.....	1,832
New Workshops.....	82,503
Shell-filling Room, Magazine, &c., at Colaba Point	13,631
Serjeant's and Lascars' quarters do.	2,516
Shell-filling Room, Serjeant's quarters, &c., Cross Island Battery	3,724
Removing arched parapet wall at the Custom House Bunder.....	699
Putting together and fitting up Saddleback Barges	31,010
<hr/>	
Total expenditure....Rs.	31,89,660

MEMORANDUM DESCRIPTIVE OF THE PUBLIC WORKS EXPENDITURE IN THE BOMBAY DEFENCES FOR THE YEARS 1865-66, 1866-67, AND THE PROPOSALS FOR THE YEAR 1867-68.

GRANT FROM IMPERIAL FUND.

By the Executive Engineer, Bombay Defences.

A sum of Rs. 2,50,000 was allowed for the Oyster Rock Battery. The amount actually spent was Rs. 86,723. This Battery is in the same state as

it was on the 1st May 1865, all works thereon being suspending pending the decision of Her Majesty's Secretary of State for India. The outlay shown above was not for work done in 1865-66, but payments made for work done in the previous year. To this *bonâ fide* expenditure a sum of Rs. 21,141 was added, being an account of uncharged expenditure for previous years (*vide* Government Resolution No. 177 M.W. of the 27th April 1866). A further sum of Rs. 2,653 has also been added to the above outlay, being on account of coal expended from the reserve stock of the previous year. Thus the total sum expended on this Battery during the year is as follows:—

Oyster Rock Battery.

Actual expenditure.....	86,723
Uncharged expenditure for previous years	21,141
Reserve stock expenditure.....	2,653

Total expenditure....Rs. 1,10,517

A sum of Rs. 6,00,000 was allowed for the Middle Ground Battery. The amount actually spent was Rs. 6,43,521. The sum of Rs. 43,521, spent in excess of the original grant, was met from the assignment of Rs. 1,00,000 made to cover the liabilities of the previous year of the Defences generally (*vide* Government Resolution No. 425 M.W.—2396 of 20th November 1865). The rubble filling being sufficiently advanced, no work was carried out this year. The sum shown as actually spent was for work done in 1864-65. To this the sum of Rs. 4,60,501 was added on account of uncharged expenditure for previous years (*vide* Government Resolution No. 177 M.W. of the 27th April 1866); also a further sum of Rs. 192 for coal expended from the reserve stock for the previous year. Thus the total sum expended on this Battery during the year stands thus:—

Middle Ground Battery.

Actual expenditure.....	6,43,521
Uncharged expenditure for previous years	4,60,501
Reserve stock expenditure	192

Total expenditureRs. 11,04,214

No specific grant was made for the Battery in Cross Island, but a sum of Rs. 305 was actually spent in this work from the allotment made for the Bombay Defences generally. This outlay was incurred in erecting a Lascars' shed on the island.

A sum of Rs. 3,724 was actually spent on the construction of a Shell-filling Room, Serjeant's quarters, and Cookroom on the Cross Island. This was met from the sum of Rs. 1,00,000 allowed for previous years' liabilities (*vide* Government Resolution No. 425 M.W.—2396 of 20th November 1865) and Government Memorandum No. 469 M.W.—2657 M. of 7th December 1865).

Rupees 283 were actually spent on the maintenance of the Colaba Point Battery, the sum being met from the allotment made for the Defences generally.

A sum of Rs. 13,631 was actually spent on the construction of a Shell-filling Room and Magazine in an epaulment, and also on placing a palisade round the Battery at Colaba Point. This outlay was met from the sum of Rs. 1,00,000 allowed for the previous year's liabilities of the Defences generally, by Government Resolution No. 425 M.W.—2396 of the 20th November 1865.

A sum of Rs. 2,516 was actually spent on the construction of quarters for a Serjeant and twelve Lascars at the Colaba Battery, this outlay being met from the sum of Rs. 1,00,000 allowed (*vide* Government Resolution No. 425 M.W.—2396 of the 20th November 1865).

A sum of Rs. 1,00,000 was allowed for the new Workshops at the Gun Cup Manufactory (*vide* Government Resolution No. 425 M.W.—2396 of the 20th November 1865, and Government Memorandum No. 469 M.W.—2657 M. of 7th December 1865). The amount actually spent was Rs. 67,573. To this a sum of Rs. 14,930 was added for coal expended from the reserve stock, thus making a total expenditure on the new workshops for this year of Rs. 82,503.

The progress made on this work on the 30th April 1865 is as follows:—

A pier constructed of dry stone 263 feet in length, 27 feet broad, and 12½ feet in height. A dry stone retaining-wall in construction of the pier line was built 300 by 8 by 10. The boat slip was then 120 by 88 by 3½, and the cross wall between the pier and the slip was then 140 by 8 by 11. Ground has been reclaimed equal in area to 23,340 square feet; 1,300 running feet

of tramway have been laid down ; the enclosure wall on the land side, 341 by 4 by 6, has been constructed as a temporary measure from dressed stones in store removed from the old workshops.

A sum of Rs. 973 was allowed for removing the arched parapet of the flanking Battery at the Custom House Bunder. The sum actually spent was Rs. 699 ; and 12,523 cubic feet of parapet wall pulled down.

A sum of Rs. 45,000 was allowed for putting together and fitting up twelve saddleback barges. The amount actually spent was Rs. 31,010.

A sum of Rs. 347 was actually spent on the surveys of Butcher's Island and the adjacent shores. This money was met from the assignment for the Defences generally.

GRANT FROM IMPERIAL FUNDS.

A sum of Rs. 2,48,924 is allowed for the Oyster Rock Battery. The amount actually spent to the 31st August 1866 is Rs. 1,071. A further sum of Rs. 929 will probably be expended upon this work during the year on maintenance, the work being suspended pending the decision of Her Majesty's Secretary of State for India.

A sum of Rs. 3,60,000 is allowed for the Middle Ground Battery. The expenditure will depend upon the decision of Government as to the precise nature of the Battery.

A sum of Rs. 4,884 has been actually spent on the construction of a Shell-filling Room and Serjeant's quarters on Cross Island. The balance of Rs. 5,011 will be spent during the year.

A sum of Rs. 11,149 has been actually spent on the construction of a Shell-filling Room and Magazine in an epaulment, and also on placing a palisade round the Battery at Colaba. The balance of Rs. 4,379 will be spent during the year from the allotment of Rs. 29,159 made for this work for the current year.

A sum of Rs. 10,894 has been actually spent on the construction of quarters for a Serjeant and twelve Lascars at Colaba. The balance of Rs. 3,019 will be spent during the year from the allotment of Rs. 7,321 made for this work, and from the balance remaining unspent from the above work.

A sum of Rs. 1,05,994 is allowed for the new workshops at the Gun Cap Manufactory according to budget, the amount actually spent up to 31st August 1866 being Rs. 56,311. To this a sum of Rs. 4,455 has been added for coal expended from reserve stock, thus making a total expenditure of Rs. 60,766. The balance will be expended during the year.

A sum of Rs. 99,021 is allowed for putting together and fitting up twelve saddleback barges from the general assignment made for the Defences for the current year, the amount actually spent up to 31st August 1866 being Rs. 37,831. The balance will be spent during the year.

A sum of Rs. 15,196 is allowed for the Hornby Battery. The sum which will probably be spent on this work if ordered this year will be Rs. 10,000. Nothing has yet been expended upon this battery.

Proposals for the year 1867-68.—The sums applied for for 1867-68 are as follows :—

	Rs.
Oyster Rock Battery	4,00,000
Middle Ground Battery	4,00,000
New Workshops	1,00,000
Saddleback Barges	30,000
Hornby Battery	1,30,500

but, as before stated, the expenditure will mainly depend upon the final decision of Government as to the superstructure of Oyster Rock and Middle Ground Batteries.

J. JONES, Lieut. Colonel, R.E.,
Executive Engineer.

In reference to the statement in Colonel DeLisle's report, that the proposed alterations in the Harbour Defences had been submitted to the Commander-in-Chief, whose decision was expected when the plans procured by Colonel Kennedy from the War Office had been received and examined—

HIS EXCELLENCY the COMMANDER-IN-CHIEF understood Colonel Kennedy was in England for the purpose of obtaining information to enable a decision to be arrived at with the English military authorities as to the nature of the defences; and any further matters which he (the Commander-in-Chief) would have to report upon would be in addition to what was determined in England. He did not understand that any question was at present awaiting his decision, or that any work was delayed because of him.

COLONEL DELISLE said that no delay had arisen through His Excellency, and that no question had as yet been before him for consideration.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said the authorities at Home had so much more information than was available here, that they could give the whole basis of what was to be done. Any report that could be given here would be in addition to the report of the Home authorities. He was confirmed in that opinion from having read Colonel Kennedy's despatch,

which gave as much information as to the defences as would be carried out for a considerable time to come.

COLONEL KENDALL referred to a report by Colonel Jervis, and sent by the Home authorities to the Government of Bombay, in which it was considered advisable to wait and see the result of the experiments upon iron works. Colonel Jervis had made a very decided report that iron should be used in all cupolas.

HIS EXCELLENCY the PRESIDENT understood that the report of Colonel Kennedy was to be sent to Colonel Jervis, and that the Government here was afterwards to receive their decision as to the precise kind of casing to be put upon the batteries at Oyster Rock and Middle Ground.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that when he was in England there was an opinion in favour of a granite casemate, but the experiments which had been made had lowered the expectations entertained of it as compared with iron, and the opinion had turned in favour of iron. He was surprised at the expectations which had been formed of granite. He was quite satisfied that iron would be ultimately used as the shield.

Plans of the harbour and of the defences having been submitted to the Conference, HIS EXCELLENCY the COMMANDER-IN-CHIEF thought the Bombay side of the harbour should be defended first, and he was very strongly of opinion that afterwards a battery should be erected on the other side of the harbour at a place opposite Karanjah called Six-foot-patch. That place would be extremely valuable as a site for a battery. If there was no battery there the channel could not be commanded; but if a battery was erected upon the spot named, an enemy approaching the harbour would be exposed to a cross-fire; and there would be in addition floating batteries to close the channel. The other changes he would advocate were, that where the batteries could not otherwise have a clear range behind them they should be on the summits and not on the faces of the hills. This change would affect the batteries at the Lighthouse and at Malabar Point.

HIS EXCELLENCY the PRESIDENT asked if it would not be a good thing to instruct the Harbour Engineer to go on with the project for the defence of the Eastern shore of the harbour?

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that the battery on the other side of the harbour at Six-foot-patch would depend upon the nature of the ground. This and the Middle Ground battery would reduce the channel to 5,000 yards. It would be desirable to have both places surveyed.

It was determined that the ground at the Six-foot-patch should be surveyed.

II.—RECLAMATIONS ON THE ISLAND AND IN THE HARBOUR OF BOMBAY.

COLONEL DELISLE read the following report on the Reclamations on the Island and in the Harbour of Bombay :—

RECLAMATIONS.

Wellington Basin.—A tender for completing this work by the Contract Building Company in six months was accepted, with the expectation that they would be able to carry out their engagements. This, however, has not been the case, and the contract has been put an end to, although the rates were very favourable. The expenditure up to date has been Rs. 2,03,767, and a further sum of Rs. 1,01,467 is required to complete it. Provision has been made in this year's expenditure for this amount by transfer, and the work will probably be completed in February or March 1867.

Apollo Bay.—This work was transferred to the charge of Lieutenant Ducat after last rains, and has since made good progress. The outer sea-wall is almost completed; that of the basin near the Wellington Pier is finished except the copings, the masonry of the large basin is only partially advanced as the foundations have been found troublesome, and the wall along the Arthur Basin is about two-thirds finished.

The sand filled in has been spread over the whole area, so that it is difficult to give an idea of the progress made. In the fair season the new contracts provide for filling up to level in successive sections commencing at the south end, this portion being required on account of the B. B. and C. I. Railway Terminus.

	Rs.
The expenditure to 1st May is	7,31,438
The allotment for this year	4,50,000
Amount to tenders	4,66,681
To complete in 1867-68.....	5,98,115

Gun-Carriage Reclamation.

The plans for this work, including a good boat basin, have been prepared. The estimates amount to Rs. 5,80,554, and have been entered in 1867-68 for completion in one season. It would be highly desirable to provide funds if possible for opening the wall at the entrance of the proposed basin, and backing the remaining portion of the sea-wall, which could then be safely taken over from the builders. The space within the sea-wall is rapidly becoming so offensive that the public would be entitled to claim the reclamation on sanitary grounds. It is proposed to assign this reclamation to the Public Works Department for a steam-factory and foundry—an accommodation which is much required, and would cause a considerable saving in the cost of works.

Bombay Flats.—A project has been submitted for extending the sluices and partially filling in the ground belonging to Government on the Flats. The estimate amounts to Rs. 21,05,014, to which about two lakhs should be added for sluices and embankment at Worlee to carry off the rain-fall on the northern portion of the Flats. The first thing to be done is to improve the sluices to avoid flooding the Native Town when the present low ground is filled up. Seven lakhs have been entered for expenditure in 1867-68 for the sluices and in the first instance the balance to be expended for filling in the ground below the level of the drains.

Moody Bay Reclamation.—This work has been much delayed in consequence of an unfortunate contract. The portion intended for workshops was completed in June, but has unfortunately been very much reduced by the necessity for providing for the G. I. P. Railway passenger station and boulevard. The erection of workshops and store-sheds has, however, been pushed on during the rains, and a quantity of excellent machinery has been purchased on very favourable terms. It is hoped that the workshops will be ready by the end of October, when the preparation of hoppers and caissons for the foundations and other auxiliary appliances will be pushed on rapidly. It seems that the allotment for cash expenditure during the year is limited to Rs. 4,50,000, the total expenditure up to 1st May being Rs. 7,13,528.

PROPOSALS FOR CURRENT YEAR'S WORK.

It is proposed to apportion the allotment for the year as under :—

Plant.....	70,000
Masonry	1,24,420
Foundations.....	1,51,725
Departmental ..	1,03,855

Total....Rs. 4,50,000

Inability to extend filling-in for want of funds.—A very favourable tender for Rs. 5,02,827 has been received for filling in the portion between the workshops and the Boree Bunder reclamation. This is much required as a protection to the new railway station, which is otherwise liable to be flooded in heavy weather. If funds cannot otherwise be procured, it would be desirable to provide for this out of Railway Land, Class D, as otherwise there may be some delay in carrying out the buildings for the new terminus.

An amount of fifteen lakhs has been entered for the cash expenditure in 1867-68, exclusive of indents from England, which will not be heavy. A few steam-cranes are required, but not much more.

Foundations.—A few words on the proposed method of putting in the deep-water foundations may be of interest. The system which has proved successful at Algiers, Marseilles, and Toulon is the guide we intend to follow. Experiments were made to ascertain whether pumice mortar would set under water. The first failed owing to the weakening effect of sand on the mixture, but those tried without sand have promised to be successful. A caisson consisting of plank sides without bottom, and lined with a tarpaulin bag, is placed on the intended position, and loaded with pig-iron in boxes to keep it steady; a travelling crab is fitted on the top, and serves to raise or lower a large hopper of triangular form containing above five tons of concrete. This is arranged to open underneath to let out the concrete with very little disturbance from commotion in the water. When filled up to the proper level the caisson is allowed to stand for a fortnight or three weeks to harden the concrete, after which the planking is removed and used again. These blocks are placed at sufficient distance apart, and to admit a hopper between them the sides of the gap are made good with planking and tarpaulin, and the space is filled in as for a caisson. Two measures of lime to three of pumice appears to be the best proportion for the mortar.

S. E. Prong Lighthouse.—The Lighthouse on the S. E. Prong is to be commenced after the rains. It has been suggested that a double ring of concrete blocks of about ten tons each should be placed round the site and made water-tight with clay puddle. This arrangement will afford a platform for the workmen and pumping engines, and serve eventually as a breakwater to the lighthouse. There will also be a considerable saving of time in the construction of the portion covered by the tide, as the workmen will not be dependent on low water for their progress.

Effect of reclamation on swell in Harbour.—A considerable portion of the foreshore in the harbour on which the waves used formerly to expend their force has now been reclaimed. The result is that the monsoon swell is more violent, and reaches further up the harbour than it used to do.

Breakwater.—This is an additional reason why a breakwater or causeway from the end of Colaba to the Lighthouse should be constructed, as it will help materially to lessen the swell at the anchorage. It is well known that after half ebb, when a considerable portion of the prong is bare, the harbour is much quieter than at highwater. The importance of a good communication from the shore to the Lighthouse need hardly be insisted on, considering that it is most required during the monsoon when a failure in the light would be attended with the greatest danger to ships entering the harbour. The construction proposed would be an outer wall of concrete blocks with an inner face of the same, the intermediate space to be filled in with

rubble ; or else the outer face might be simply backed with a rubble slope on which the waves might break.

ARCHITECTURAL EXECUTIVE ENGINEER.

Buildings completed.—The following buildings have been completed :—

The Ophthalmic Hospital.

Wellington Fountain.

Leper Ward.

Roads.—And the following roads :—

From central station to Mahaluxmee.

From central station to Worlee.

College in progress.—The Elphinstone College has also made good progress ; the lower storey is completed with the exception of the corridors, of which about two-thirds have been built.

Alterations or additions at Government Houses.—Some alterations at the Government houses at Parel and Malabar Point are also in progress.

Chaplain's residence.—A residence for the Chaplain at Byculla will be commenced this year.

Alterations in St. Thomas' Churchyard.—An alteration in the Churchyard of St. Thomas' Cathedral.

Eastern Boulevard.—This work is suspended pending decision as to its course from the Mint to Marine Street.

EXECUTIVE ENGINEER, PRESIDENCY.

Temporary Barracks.—The only large works in this department are—

Two temporary Barracks at Colaba.

A Serjeants' Mess and Reading-room.

Warrant Officers' Bungalows.

Dockyard.—In the dockyard sheds have been erected over the Falkland slip and the gridiron, and a cofferdam was constructed for repairs to the gates of the Bombay dock.

Current year.—There are a number of minor works, but none of any great importance.

Local Funds.—Nothing has been done beyond small improvements on the Esplanade and repairs.

Local Funds for current year.—For the current year Rs. 94,373 have been sanctioned for Rotten Row, Rs. 28,022 for footpaths and roads, and Rupees 12,000 for planting trees, besides Rs. 38,793 for conservancy and maintenance.

The Executive Engineer draws attention to the inefficiency of the maistrees from the Poona Engineering School, as they are not workmen. The proper way to provide maistrees would be to select intelligent workmen and send them to the Engineering School to learn drawing, mensuration, and European methods of working.

A. DELISLE, Lieut. Colonel, R.E.,
Consulting Engineer to Government.

In reference to the Apollo Bay Reclamation, COLONEL DELISLE remarked that it was one of the works which had been stopped by the Government of India.

In reference to the Gun-Carriage Reclamation, COLONEL DELISLE remarked that it would be very desirable to provide funds for opening the mouth of the new basin and backing the sea-wall with earth. It was decided that a written application should be made on the subject.

III.—THE FLATS.

Plans of the Drainage of Bombay having been submitted, HIS EXCELLENCY the COMMANDER-IN-CHIEF asked why the drainage had been diverted towards Colaba rather than towards the shore at the Flats.

MR. CRAWFORD pointed out that tidal observations had been taken down the whole of the western foreshore, and that these showed that although the rain would be mixed with a large body of tidal water, yet during eight months of the year it would be driven back on the shore between Malabar Hill and Worlee Point, and thus poison the whole city. He referred to Mr. Aitken's preliminary report on the drainage outfall for the city of Bombay which was already before Government. It was shown that the rain must be discharged somewhere on the lee or harbour side of the island, and it remained to select a spot from which it might be discharged into the outer tidal current and carried clear of the foreshore.

On a question from His Excellency the PRESIDENT, MR. CRAWFORD stated that he was about to submit to the Government a scheme of Mr. Russel Aitken's for the abolition of the main-drain nuisance on the Flats. He laid the plans on the table, and briefly explained that it was proposed to intercept the main-drain at Bellasis Road overbridge, and carry it off in a three-foot barrel-drain straight to the Love Grove sluices. At the sluices would be erected two 20-horsepower engines, with Gwynne's centrifugal pumps, which would lift and pump day and night, discharging at all states of the tide into the sea. The effect of this would be not merely to draw

off the whole of the rain which during two-thirds of the twenty-four hours is ponded back on the Flats and throughout the low districts between the Bellasis and Grant Roads, but also to drain the Flats themselves of moisture during the fair season. Another smaller drainage pipe would be laid across to Sendulpara, near the Byculla station overbridge, through which would be drained off all the rains at present dammed up in that horrid locality. The main-drain itself during the fair season would remain a freshwater dyke, uncontaminated by any foul matter. At present the sill of the main-drain was so very high that there was no fall from the main-drain at all, so that there was no discharge through the sluices, which would only be opened about six hours out of the twenty-four. The result was that whenever the whole of the sluices were closed the whole of the rain was ponded back. The present open main sewer covered no less than $4\frac{1}{2}$ acres in extent, and was an extensive cesspool, which would by this plan be abolished; it would only cost Rupees 1,75,000, and he proposed to ask Government for some assistance as the Government property would be much improved.

HIS EXCELLENCY the PRESIDENT said that of the two parts of which the drainage was to consist, the sewage part might perhaps be provided from the Municipality funds, and the storm-water part out of Government funds. The two sluices would require nearly three lakhs to complete them, and the total expenditure that would be required for the removal of the storm-water from the Flats would be five lakhs.

MOODY BAY.

In reference to the Moody Bay works, plans of the reclamation having been submitted, MR. CRAWFORD, Municipal Commissioner of Bombay, said he had a communication from Mr. Russell Aitken, the Engineer to the Municipality, who had very great experience in the construction of Dock-works at home, and Mr. Aitken had pointed out that the Government property at Moody Bay presented very much greater facilities for the construction of Docks, and that, too, at very much smaller cost, than did the Elphinstone Company's property. It had, moreover, the Railway terminus close at hand. The success of the Moody Bay reclamation depended upon docks being constructed, and as soon as docks were constructed in Moody Bay the basins of the Elphinstone Company would be used only by coasting craft.

COLONEL KENDALL observed that in Sir George Clerk's time it was decided that docks should not be constructed, both on sanitary and social grounds. It was considered that several large bodies of stagnant water would become very foul and prove injurious to the health of the town, and that was the opinion given by Government at the time. Government had gone very

fully into the question, which had come up again six months ago. What Mr. Crawford said about the superiority of the Moody Bay property to the Elphinstone Company's as a site for docks was well known.

Mr. CRAWFORD remarked that Mr. Aitken had pointed out that there was sufficient room at Moody Bay to receive any ships that come into the harbour. Mr. Aitken had showed most clearly to him that unless docks were constructed in Moody Bay, Moody Bay would become merely an extension of the native town; and for all other purposes it would become nearly valueless. Mr. Crawford added that as the sewage of the town would be discharged several miles from the docks, there could not be any objection to docks on sanitary grounds.

LIGHTHOUSE S.E. PRONG.

In reference to the proposed Lighthouse S. E. Prong, COLONEL KENDALL said that the plan sent in formerly had not been considered suitable, and now plans had been called for, but they had not yet been received.

HIS EXCELLENCY the PRESIDENT asked Colonel DeLisle if he saw any difficulty in the work when once it would be fairly in hand.

COLONEL DELISLE said there would be some practical difficulty in laying the blocks, which would have to be laid circularly under water.

In reference to the Eastern Boulevard from the Mint to Marine Street, which according to Colonel DeLisle's report had been suspended pending the decision of Government as to its course from the Mint to Marine Street—

HIS EXCELLENCY the PRESIDENT said that the subject should be brought up before Government without delay. There was no reason why the course of the Boulevard should not be decided in a short time; by humouring the property a little it was possible to get right into the Elphinstone Circle without touching anything but a few cattleheads.

COLONEL KENDALL remarked that it would be necessary to take a portion of the Mint compound in order to save the Town Barracks.

THE TRAINING OF MAISTREES.

Before the meeting dispersed COLONEL BELL called the attention of Government to the very urgent necessity that existed of training a class of men for the purpose of taking up appointments as maistrees—such a class of men as was being trained at Poona. The Railway Company had absorbed that class to such an extent, by giving them high salaries, that maistrees could not be got now.

HIS EXCELLENCY the **PRESIDENT** asked if Colonel Bell thought it was a question merely of salary, or if it was a question of training, that had reduced the number of maistrees. Supposing Government raised the salaries of the maistree class, could maistrees be obtained?

COLONEL BELL thought maistrees might be obtained if Government increased their salaries, because they were willing to serve Government for less than they would serve other people.

The **HONOURABLE MR. ELLIS** said the mistake lay in appointing men to the office of maistrees merely in consequence of their knowledge of geography and the fine arts.

HIS EXCELLENCY the **PRESIDENT** said that was a question Government proposed to consider with a view to the extension of the College in Poona, but it was rather too large a question to be discussed at the present meeting. Some papers had been laid before Government in which Sir Alexander Grant and Captain Waddington expressed an opinion in which the present state of the Poona Engineering College with regard to space and the means of improvement were discussed. The point would be one which it would be useful to consider separately. He was not sure how many gentlemen who took part in the discussion had been over the College lately. He himself had gone over it the other day, and was very much struck with the entire want of room. There were not the means of instructing more than two or three of such men as Colonel Bell had described, and all the appliances to enable officers to go through a military course of civil engineering had entirely disappeared. He found that all that had been done was in abeyance for want of room.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** felt it to be a matter of very great regret that such means of instruction had lapsed, as the institution must have been a very useful one.

HIS EXCELLENCY the **PRESIDENT** suggested that the Commander-in-Chief should go through the present premises. If he did so he would see that a great deal more was necessary than existed. There were two very small and very hot bungalows which were crammed with young boys, all in different stages of learning, and it was practically impossible for them to get there a complete course as the institution stood at present. That the maistrees who did go there for instruction should sit at the desk and get any peculiar knowledge was quite out of the question. A great deal might be done if there was more house-room.

SALE OF LAND ON THE ESPLANADE.

COLONEL KENDALL said that the Architectural Improvement Committee had submitted a proposition that land on the Esplanade should be made out in plots instead of being put up to auction, and certain prices affixed to them, and communicated, along with the conditions of sale, to any body who wanted plots. He read the letter from the Architectural Committee on this subject, and on the character of the buildings that should be erected.

HIS EXCELLENCY the PRESIDENT thought there could be no objection to the proposal, for all that had been done hitherto was to find out what was the utmost the lots would fetch under the most favourable circumstances so as to enable Government to fix a regular rate.

The HONOURABLE MR. ELLIS, looking at the plan of the proposed laying-out of the Esplanade, suggested that the site of the School of Arts should be removed a little in the direction of the fountain.

MR. CRAWFORD added, as a reason for giving effect to Mr. Ellis' suggestion, that the site of the market was in the neighbourhood of the School of Arts, which would accordingly be a very busy place, and not favourable for such a building.

This question will again come before Government, and HIS EXCELLENCY the PRESIDENT instructed the Secretary to Government to have the conditions of sale of the plots printed and circulated.

The Conference then adjourned till Tuesday, the 25th September.

FIFTH MEETING.—TUESDAY, 25TH SEPTEMBER 1866.

ROADS IN GUJARAT.

The Conference met again to-day, His Excellency Sir BARTLE FRERE, G.C.S.I. and K.C.B., presiding.

COLONEL BELL brought forward some papers by Executive Engineers regarding road works in Gujarat.

HIS EXCELLENCY the PRESIDENT said that Gujarat was a country so level that it was a cart country, and the people of almost every village accordingly used carts. He spoke within compass when he said that there were not twenty miles of bridge and metal road in Gujarat, which was, nevertheless, the most paying province Government possessed.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that it was another Bengal.

HIS EXCELLENCY the PRESIDENT said that it was; but it was a Bengal without deep rivers to disturb carts, without deep rivers to help the traffic, and generally without the ravines which were obstacles to the cart traffic in many parts of the Deccan. Colonel Bell had paid an immense deal of attention to road-making in Gujarat generally, and had told the Government some years ago that the only plan to adopt was to take a wide strip of country and to purchase it. One of the chief difficulties in Gujarat was that land could not be got without paying very heavily for private property. Colonel Bell told Government that the only plan was to purchase this property and raise it in the centre to the necessary height and width by embankments, and finally to bridge and metal these embanked portions. But the purchase alone, in a general way, was an obstacle to getting a long extent of road. There was one particular line which had been a thorn in the side of everybody connected with revenue or public works in Gujarat, and that was the great trunk-road between Gogo and Ahmedabad. It was intended to give access to Ahmedabad, with a branch to Dholera, and a road to Gogo, which was the best port in Kattywar. The road had had a great deal of money spent upon it. The best course would be for Colonel Bell to lay briefly before the Conference the latest advices he had received as to the state of the road, and to state what he was prepared to advise should be done. Mr. Ellis had paid as much attention as anybody to

the road, and Mr. Hadow knew it very well. The programme for the next season must be greatly modified by the damage which was done to the road from the unprecedented floods in last August.

COLONEL BELL stated that the road was originally intended to be completed from Gogo to Ahmedabad, and was to have had a low embankment and a few drains. It had been carried on in that way, and a large portion of the embankment had been completed, but the occurrence of the mutinies led to the suspension of the work, and a considerable portion of the road had been washed away. In the late storm the country was flooded, and a great mass of water was moving slowly across the country for some weeks towards the Gulf of Cambay. Successive monsoons had soon after the suspension of work made the portion of the line of road immediately north of Dhundooka a perfect ruin, and in fact it was in so bad a state that the idea of making a road north from Dhundooka had been abandoned, as the country was a perfect marsh. It had been resolved to complete the line of road, however, from Dhundooka to Gogo. There was a tract of twenty miles along which the road embankments could be made, but no road metal could be obtained. Bridges, however, had been built, some on screw-piles and some of masonry. It was hoped before the storm occurred that this year the road would have been reported completed from Gogo to Dhundooka. From this road it was intended that a branch should strike off to Wudwan, where a large station was to be established. Nothing was intended to be done for some thirty miles north of Dhundooka; but near Ahmedabad, where, for about thirty miles, the ground was more favourable, it was proposed to complete the unfinished and partially ruined road to the railway terminus at Ahmedabad. From each of the districts west of Ahmedabad roads were to converge upon this road. The central portion of the road between Bhamara and Dhundooka was to be left in its present state.

HIS EXCELLENCY the COMMANDER-IN-CHIEF understood the whole of this tract of country was submerged in the monsoon.

COLONEL BELL said it was; and in reply to His Excellency the PRESIDENT, he stated that when the traffic commenced in November a large quantity of traffic which came down from Veerumgaum and the cotton districts was enabled to get over the rivers by means of the isolated bridges which had been erected, without which the traffic would not have been able to pass.

HIS EXCELLENCY the COMMANDER-IN-CHIEF remarking that Colonel Bell had said that the road was an embanked road, asked how a causeway not raised would answer the purpose of a road in a country like Gujarat. Of course it would be an expensive road, but it would not be a raised road.

There would be no embankment to sweep away, and the water would run over it.

COLONEL BELL said that such a road would certainly dry sooner than the rest of the soil, and would consequently not continue soft so long, but it would probably be altogether obliterated.

HIS EXCELLENCY the COMMANDER-IN-CHIEF asked what was to prevent a cart travelling in the rains.

COLONEL BELL replied that the whole country was under water for a month and more during the monsoon.

HIS EXCELLENCY the PRESIDENT said that the Gulf of Cambay had evidently at no very distant period extended almost to the line of road, and that a branch of it extended in a north-westerly direction across Kattywar and communicated with the Runn of Cutch. If one went across to the Runn of Cutch, which was once a hollow apparently, he found that the land rose a very few feet above highwater mark, and the rain which fell very heavily in the country of Kattywar came down upon this district, which was merely a bank raised a very few feet above the highwater mark of the Gulf of Cambay, so that when the wind was driving the Gulf water up very high, and the monsoon water was consequently banked up, the whole of the great plain was under water. The mud was very fine and deep, and firm ground could not be reached at any distance below the surface. When the ground dried, the surface caked, and the people began to travel as soon as the surface would bear a cart. But if the cart was heavier than usual, it went through the crust into the mud below; or if people began to use it a week too soon, they were going over a crust which covered treacherous mud below. The numerous creeks in the district are filled with this mud and water until late in the season, and he believed these creeks ran up all the line of the road.

HIS EXCELLENCY the COMMANDER-IN-CHIEF inferred from His Excellency's remarks that he did not consider it a country which it would be worth while making passable in the rains.

HIS EXCELLENCY the PRESIDENT said that if it were possible for any practicable sum to make it passable it was worth being done, as the line was invaluable in itself, and the communication between Ahmedabad and the only good port which had been opened in the Gulf of Cambay, and it was a sort of frontier road to the whole of Kattywar.

COLONEL BELL said that the road was originally intended to cost two lakhs of rupees for 120 miles; but now 60 miles had cost 13 lakhs, and these 60 miles were not finished yet. He thought in the central portion it was not possible to make a road. Any amount of money might be spent, but the road when made could not be depended upon.

THE HONOURABLE MR. ELLIS said that the correct idea under the circumstances was not to consider the road as one from Ahmedabad to Gogo, but to consider it as consisting of two portions diverging from the marsh north of Dhundooka. One portion was to run from Dhundooka down to Gogo, and provide an outlet for the trade of the cotton district. The other portion was to run from Bhamsra to Ahmedabad, and was intended, by conveying the produce of the district, to form a feeder to the B. B. and C. I. Railway. It was not therefore so essential that the central portion of the road from Bhamsra to Dhundooka should be formed. Looking to the great extent of the road, it was considered advisable to concentrate all the energies of Government on the portion which ran from Dhundooka to Gogo, and to open out the other part so as to put that district of country in communication with the railway at Ahmedabad.

MR. HADOW, in answer to His Excellency the PRESIDENT, said that the country on the other or north side of the Null was superior for the purposes of road-making. A European regiment marched up that way during the time of the mutinies.

HIS EXCELLENCY the COMMANDER-IN-CHIEF asked Mr. Ellis whether he considered the road beyond the means of Government.

THE HONOURABLE MR. ELLIS replied that a portion of the road might be left undone in the meantime, and the chief question was to connect as much country with the railway as possible. There was only a limited supply of money, and it was better, as he had said, for Government to concentrate its energies upon what could be done.

COLONEL KEATINGE, who was present, said, in answer to His Excellency the PRESIDENT, that the country to the north of the Null was very much better than the country to the south.

COLONEL BELL said that he had expected that the line of road by Wulla and Burwala, from Gogo to Dhundooka, would be completed by the next rains, but the injury done to the road was very unfortunate; the loss would not be great, and he (Colonel Bell) believed that Rs. 75,000 would cover the damage.

HIS EXCELLENCY the PRESIDENT understood that the great questions were, whether the road was to be restored, and was it to be restored as a high-embanked road or as a low-embanked road.

COLONEL BELL thought it must be restored on the same principle as that on which it had been constructed, viz. as a highly-embanked road. A flood such as had occurred this year was very unusual, and one like it had not taken place for years past.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said that the road must be made either entirely safe above the floods, or not raised at all. If the embankment were secured it would drive the water into fixed channels.

The **HONOURABLE MR. ELLIS** thought ample provision should be made for waterway; and Colonel Bell remarked that such provision had been made.

Some few remarks passed between **HIS EXCELLENCY** the **PRESIDENT** and the **Commander-in-Chief** as to the level according to which the road should be restored, and **COLONEL KEATINGE** said he might, as the only officer present who had seen the road since the damage had occurred, inform **HIS EXCELLENCY** that it would be impossible to alter the level of the road. Several patches occurred in a space of fifty yards at one place, and several more occurred within a space of 100 yards at another, while in the centre there were large banks, so that there was nothing for it but to replace the road upon the old high level.

COLONEL BELL, in reply to **HIS EXCELLENCY** the **PRESIDENT**, said such work would be as much as could be done within the present official year, and it would take the whole of next season to bring the road back to the *status quo* of last July. In answer to further questions from **HIS EXCELLENCY** the **PRESIDENT**, Colonel Bell stated that the cheapest construction of bridge, and that now proposed to replace the large bridge at Burwalla which had been washed away, was to have iron girders on stone piers. Formerly it used to be cheaper to have the bridges built entirely of stone.

HIS EXCELLENCY the **PRESIDENT** expressed himself satisfied with the style of bridge proposed.

THE VEERUMGAUM ROAD.

COLONEL BELL, in answer to **HIS EXCELLENCY** the **PRESIDENT**, said that this road was standing, and nothing further was to be done upon it at present. There was no metal upon it. It was a drained road, and had a surface of embanked soil of more or less hardness. The road, however, could not be used. It would be metalled with kunker at great cost, but the local fund could not bear the expense of keeping it in repair, which would require about ten per cent. upon the original cost of construction. If the completing of a mile of road cost Rs. 15,000, that represented a yearly burden on the local fund of Rs. 1,500, which no local fund could bear.

HIS EXCELLENCY the **PRESIDENT** asked what the inference was from that, that there was no use making roads?

COLONEL BELL had reported to Government in reference to this subject. He was of opinion that they should begin by taking up the land in the first instance, and after defining and clearing the riband of 110 feet thus taken up,

should continue by bridging all the rivers and nullas that obstructed the traffic or broke the axletrees of carts. If moorum or metal could be obtained in the district north of Ahmedabad it might be used, the road being embanked in the usual manner for the reception of this coating. But there was no use whatever in constructing embanked roads in Gujarat. The want of hard coating material rendered this, the usual plan in other districts, a waste of money. The Executive Engineer in the district had, under his directions, caused clods of soil to be dug, and they had tried to burn them so as to make them into bricks; they had tried to vitrefy them, but the result had been very unsatisfactory. Nearly all the made portion in Gujarat had been coated with the debris of old buildings, and a good road surface for light traffic was thus obtained wherever it was possible (as in and near Ahmedabad) to secure regular watering. As His Excellency the PRESIDENT was aware, Mr. Sowerby had proposed the construction of tramways. Any suggestion for providing tramways would be good if they could be constructed at a reasonable rate.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought it seemed to be a country for a tramway.

HIS EXCELLENCY the PRESIDENT said that Mr. Hadow had taken a great deal of interest in the short line of road between Kaira and Mehmoodabad road which had been proposed, and which was to extend six miles from the B. B. and C. I. Railway station. It cost a very considerable amount; the ground was bought up, the embankment was made, and a facing was put upon it of the best kunker, and the material was the best that could be got. It did very nicely for a very light cart, and was of very great convenience to people driving in carriages, but he did not think it possible to let heavy carriage carts go upon it.

MR. HADOW could not inform His Excellency the PRESIDENT of the result of the experiment, as the road had not been quite consolidated when he left.

HIS EXCELLENCY the PRESIDENT said there seemed no hope of getting heavy carts upon it. The road had cost Rs. 7,000 a mile to construct.

COLONEL BELL said that Rs. 42,000 had been spent upon the road, at the rate per mile His Excellency had mentioned. It would probably cost Rs. 1,000 per mile, or Rs. 6,000 per annum, to keep it in repair, which the local funds could not well afford. The establishment of tramways was the only hope he had of seeing roads made in Gujarat, but unfortunately there were difficulties attending them: they involved raised rails and flanged wheels, and what was required was something to suit the existing carts of the district.

HIS EXCELLENCY the COMMANDER-IN-CHIEF thought that if tramways could be successfully laid the natives would very soon adapt themselves to the change. They were not quick in initiating an idea, but when an idea was put before them, and the advantage showed itself, they were not slow to avail themselves of it.

The HONOURABLE MR. ELLIS thought they might as well have a railway at once as a tramway. Tramways had disadvantages of their own, and they had none of the advantages of railways. If the nullas were bridged people could get along over the country, and it was perhaps better to have that done than to have highly-embanked roads. As for the trunk lines of communication, he would have railways.

HIS EXCELLENCY the COMMANDER-IN-CHIEF suggested that one great advantage in tramways was that they admitted of steeper gradients and sharper curves than railways.

The HONOURABLE MR. ELLIS replied that there were no gradients in Gujarat beyond 1 in 500.

HIS EXCELLENCY the PRESIDENT said that the advantage of a tramway was obvious, supposing it was possible to get a tramway like the Welsh metal tramways which would take a cart of a certain gauge, and with a pair of good wheels and an iron circle the purpose would be accomplished. These were the only requisites for enabling a cart to go on a Welsh coal tramway. If some such tramway could be got so that there would be no stationmasters and no rolling stock, a great advantage would be gained.

COLONEL BELL explained the principle of an iron groove tramway proposed by Mr. Sowerby, a Local Fund Engineer at Surat. He went on to state that a cheap tramway had been suggested in Bengal, which was to be formed by laying in a bed of sand bricks or tiles 12 inches square and 2 inches thick, on edge, with sand sprinkled over them. Bricks or tiles of sufficient strength could not, however, be made in Gujarat. The only possible way would seem to be to provide a flat iron surface to serve the purposes of the bricks. He submitted plans of various kinds of tramways, remarking that the most economical kind came to Rs. 7,000 per mile according to Mr. Sowerby's rate of calculation, but that he thought was too favourable. Others came to Rs. 10,000, which was to provide a surface for a common cart. He did not believe in Mr. Sowerby's principle himself.

The HONOURABLE MR. ELLIS said the principle of a tramway might be all very well so far as the wheels were concerned, but how were the bullocks to get along if they were up to the knees in mud? Bullocks would not be got to travel on hot iron plates in the heart of Gujarat. Tramroads did not solve the difficulty.

COLONEL BELL referred to an offer by Mr. Bulkley to make a railroad along a portion of the line of road.

THE HONOURABLE MR. ELLIS had received the offer, which proposed among other things that the bridges should be built out of the local funds, and be then handed over to Mr. Bulkley with a subsidy besides. It was out of the question that he could get the bridges and the subsidy besides. Mr. Bulkley's plan was a railroad and not a tramway, that was one satisfaction.

MR. REID said that one mile of tramway had been sanctioned by Government for Surat.

COLONEL BELL thought that every professional engineer who had seen Mr. Sowerby's tramway would think that any money spent on it might as well have been thrown into the sea.

HIS EXCELLENCY the PRESIDENT thought it would be well that Mr. Sowerby's plan should be tried; or was there any other plan which should receive a trial in preference? There was this much to be said for a tramway, that if it answered for half a mile, it would be good for one hundred.

HIS EXCELLENCY the COMMANDER-IN-CHIEF suggested that as the difficulties in the way of laying a tramway were so great it might be better to lay pot-sleepers.

COLONEL KEATINGE asked if, in the principle of the proposed tramway, any provision was made for carts crossing it or meeting each other.

HIS EXCELLENCY the PRESIDENT said there was not, but thought it would be easy for carts to get off and on again.

COLONEL KEATINGE thought it would destroy the tram and break the edges of it.

COLONEL BELL said that the raised edges of the rails of Mr. Sowerby's tramway would be sure to be broken, and that if a cart once got off it could never get on again.

HIS EXCELLENCY the PRESIDENT repeated that the plan ought be tried at some place. At Ahmedabad, for example, there were a few civilised carts. A mile of tramway could be tried there according to Mr. Sowerby's plan, and in the meantime Colonel Bell would send in to Government the plans he had exhibited to the Conference. If it was found on trial of a small section that that tramway was of no possible use, then there was an end of it, and nothing more would need to be done about it.

COLONEL BELL said it would be necessary to check the calculations of Mr. Sowerby as to the cost of the tramway, as he had both largely understated the weight of his rail and under-estimated the cost of his iron work.

ROAD FROM AHMEDABAD TO DEESA.

COLONEL BELL, in reporting as to the progress which had been made in connection with the road from Ahmedabad to Deesa, said that he had received surveys and drawings from the officers in charge of the road. There were some difficulties attending the formation of this road, fully more than one-half of which passed through the territory of the Guicowar. The actual metalling, bridging, and draining of the road were estimated at Rs. 16,80,000, of which ten lakhs were the estimated probable cost of metalling alone.

HIS EXCELLENCY the PRESIDENT said there were two lines which had been under consideration. One line went to the east of the direct line; the other went to the west of the direct line, and was out of the reach of any known metalling, and that was the reason why the Railway Company had preferred having their line to the east. Nobody advocated the straight line.

COLONEL BELL stated that the estimated amount which he had recommended for immediate expenditure was Rs. 57,000.

HIS EXCELLENCY the COMMANDER-IN-CHIEF observed that the cost of the road from Ahmedabad to Deesa would be Rs. 17,000 per mile. He believed a railway would pay from what he had seen of the country.

COLONEL BELL said that if a railway were constructed a clear road would serve all purposes.

The HONOURABLE MR. ELLIS said it had occurred to him whether, as they were saved making a line from Veerumgaum, a road could not be made very much less in length, very much cheaper, and very much more important, politically, by the line being carried through a very small portion only of the Guicowar's territory. He thought a road from Deesa to Puttun would suit the purpose. By avoiding the Guicowar's territory as much as possible in constructing the road, British territory would have the advantage of it, and there would be no complications.

In answer to HIS EXCELLENCY the PRESIDENT, COLONEL BELL said that the line of the proposed road was different from the line which was intended according to present railway surveys, in the event of one being made. The road did not make any violent curves, and was not very far from the intended line of railway.

HIS EXCELLENCY the PRESIDENT thought that any line of road which would be made on Colonel Bell's system of purchasing and clearing the land should not be far from the line which would be used as a railway, so that any thing that was now in the construction of Colonel Bell's road would not injure the future of the railway.

COLONEL BELL said that the line of road was prepared on a different principle to that on which a Railway Company proceeded in constructing their line. The Company systematically avoided villages, preferred as straight a line as possible, and did not care whether they went near a village or not. On the other hand the line of a road was generally so arranged as to make gentle curves in order to approach villages. Roads did not leave villages miles on each side of them as railways did.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** thought that railways generally went out of their way to pick up a town.

COLONEL BELL said that was not the case on the Baroda line.

HIS EXCELLENCY the **PRESIDENT** thought the best plan would be for Colonel Bell to prepare the same sort of estimate of the road from Veerungaum to Deesa that he had prepared on the road from Ahmedabad to Deesa.

COLONEL BELL said that all that was necessary was to take village distance, as the rate was a mere mileage rate. The difficulties in the case of the one road would be the same as in the case of the other, as it was precisely the same character of country that the road passed through.

The **HONOURABLE MR. ELLIS** said there would be about 12 miles out of 18 to construct from the local funds. At Puttun and Myhee Canta the Chiefs were easy to deal with; but the Guicowar did not see the desirability of making the road.

COLONEL BELL said, in reply to His Excellency the **PRESIDENT**, that the road had been sanctioned, and it would be dealt with in the same way as the Deesa road. The entire line would be first cleared and taken up, and the difficult ravines and some others would be bridged over, after which a report would be made to ascertain how far the remainder of the sanction was to be expended. There was no use spending the public money in making embankments which might never be used, as had been done in many other parts of Gujarat. The sum of Rs. 50,000 had been sanctioned for expenditure during the present year.

SABURMUTTEE BRIDGE AT AHMEDABAD.

COLONEL BELL said the Government of India wished to know whether the Sabarmuttee bridge at Ahmedabad could not be built more economically. The tenders received in India were more economical than those received from England. Nothing required to be discussed, and it was only necessary to lay the project before the Government of India. The steps already taken had been taken in anticipation of the bridge being sanctioned.

HIS EXCELLENCY the **COMMANDER-IN-CHIEF** said the site was as definitely fixed as it could be.

The HONOURABLE Mr. ELLIS said that the Municipality had gone to great expense in making roads on the faith of a promise that the bridge was to be on the very spot which had been fixed upon. He believed that the amount spent on roads out of the local funds was Rs. 1,15,000. Sir William Mansfield saw the place approved of for the bridge.

HIS EXCELLENCY the PRESIDENT said that the bridge was intended essentially for the townpeople, and the site was the most convenient for them.

MR. PREMCHUND ROYCHUND'S SCHOOL.

COLONEL BELL said that Rs. 5,000 were required as an additional help towards the completion of Mr. Premchund Roychund's school. All the money contributed by Mr. Premchund had been paid, and no more was to be expected.

HIS EXCELLENCY the PRESIDENT instructed Colonel Bell to write to Government, and the application would be considered.

ROADS IN KAIRA.

MR. BORRADAILE, Collector of Kaira, reported that the two principal roads in the Kaira collectorate were far beyond the local means at his command. He had not the money to repair them, or finish them, or even to keep them in repair when finished, the roads having been commenced on so very large a scale.

COLONEL BELL said there were miles of embankments along these lines of road.

MR. BORRADAILE said he had in his collectorate upwards of 100 miles of roads, and only ten miles had been completed. There was another small road which was partly a local road, and which he proposed to complete and keep up.

The HONOURABLE Mr. ELLIS said that even considering these roads to be purely local roads—which they were not—there was no difficulty in making a grant for them; they were valuable as railway feeders.

MR. BORRADAILE said that Government had given an order for certain iron work which was coming out from home, and the grant now required was for the bridge at Kupperwunj.

COLONEL KENDALL said that if a statement of the requirement was sent in it would be duly considered.

SURAT AND BROACH.

COLONEL BELL said the largest work proposed in the Surat and Broach districts was a new distillery in Surat, of which the plans and estimates had been received. The present distillery was a perfect nuisance. The project

would duly come up to Government, the grant required being Rs. 25,000. There was one great defect in these districts, as in other parts, and that was that roads had been commenced out of the local fund balances, and, being underestimated, the local funds could not carry them on; grants-in-aid therefore were required for the work.

HIS EXCELLENCY the PRESIDENT said that Colonel Bell referred to a number of short roads of ten, sixteen, and twenty miles in length, intended to connect large towns with the railway north of Surat. He asked Colonel Bell what he preferred should be done about them.

COLONEL BELL replied it was a question whether or not a grant-in-aid from the Imperial fund could be obtained. He would recommend that such a grant should be given, because there was no other possible means of completing the road.

HIS EXCELLENCY the PRESIDENT said that these short pieces of road had been commenced on estimates which had proved very insufficient, and the soil was of black soil. There was nothing for it but considerable embankments and good metalling. It would take about Rs. 12,000 a mile to finish them.

HIS EXCELLENCY the COMMANDER-IN-CHIEF said that in a flat country without any large rivers and with metalling accessible, the rate of constructing a road some years ago was about Rs. 7,000 a mile. The nature of the country in the present case would be quite sufficient to account for the difference in the rates.

HIS EXCELLENCY the PRESIDENT instructed Colonel Bell to send in the application, and Government would do its best to make the grants required.

ROAD TO DAMAUN.

COLONEL BELL stated, in reference to the road from the Railway station to the Portuguese town of Damaun, that there was no grant for the present year at all.

COLONEL KENDALL thought that the full amount of the estimate had been granted. The project could, however, be sent on to Government.

SURAT HIGH SCHOOL.

COLONEL BELL stated that Sir Alexander Grant had obtained a design for the Surat High School from Mr. Theodore Cooke, which had been referred to him (Colonel Bell) for any remarks he might have to make thereon. The design, however, had not reached him. Mr. Mant had pointed out some defects, and said that he was prepared to submit a design which he had asked permission to send in. He (Colonel Bell) found a High School had been built in

Dhoolia, the designs of which he had never seen at all. It had been prepared by a young officer, Mr. Haydon. He had referred to Government to ascertain if he had anything to do with this school, and was told that it belonged to the Educational Department, and was therefore independent of the Public Works Department.

COLONEL KENDALL said the Educational Department had asked if they might have a private architect to send in a plan of the school. Mr. Theodore Cooke was accordingly asked to send in a plan. Some alterations were required, and the plan was ordered to be sent to Colonel Bell for an estimate.

HIS EXCELLENCY the PRESIDENT, in reference to the circumstance of the Dhoolia school being under the Educational Department, said that as long as a project did not come into Colonel Bell's budget, and as long as it did not take up any public money, any assistance rendered by the Public Works Department was a matter of mere friendly advice.

MR. ASHBURNER, Collector of Khandeish, said that he had been trying for many years to get plans for schools in Khandeish, and at last he had got plans and commenced work. He did not require any Government money for these works. The great objection to his action on the previous occasion was that the plans had not been prepared by the Public Works officer. On this occasion they were prepared by Lieutenant Haydon and approved of by the Educational officer, and he thought all was right. It was a building in which there was no special complication.

COLONEL BELL thought that the plans should have passed through his hands.

The subject here dropped, and the Conference adjourned until the following day, Wednesday, 26th September.

SIXTH MEETING—WEDNESDAY, 26TH SEPTEMBER 1866.

IRRIGATION IN THE DECCAN AND THE SOUTHERN MARATHIA COUNTRY.

The Conference met again at Poona to-day, Sir BARTLE FRERE, G.C.S.I. and K.C.B., presiding.

With regard to the question of irrigating the Nowlgoond and Nargoon cotton plains, COLONEL PLAYFAIR pointed out the Mulpurba river on the map, and the gorge between the villages of Katurbul and Kullolee, and showed that if a dam about 160 feet high was made across the said chasm near a temple known as the Peacock's Shrine (which dam was practicable) a magnificent tank about 70 miles in length, filling the whole valley to beyond the town of Khanapoor, could be made; but that although it would be so fine a work, comparatively so easy of execution, and such a grand monument of our Government, exceeding in size, as it would do, anything of the kind ever made by our native predecessors in this part of India, still if carried out it could be but of little use to our districts because our lands did not lie below but on one side of it, and that the country below, which it naturally ought to water, belonged to the Nizam. To illustrate this Colonel Playfair drew attention to the portion of the cotton plains about Nargoon and Nowlgoond, and the dividing ridge at the village of Kurreekuttee, and explained that the latter village, situated on the lowest point of the ridge, was 155 feet above the present bed of the river. Supposing then the aforesaid dam to be built, the highwater surface of the lake would scarcely reach the top of the ridge; that a cutting of 50 feet in depth through the ridge was practicable, though it would be three miles long and in the hardest granite, but that such cutting would only tap the upper layer of water in the lake, leaving more than 100 feet in depth stagnant and useless.

BELGAUM COLLECTORATE.

In reference to the works in progress in the Belgaum Collectorate, His EXCELLENCY the PRESIDENT asked what was the condition of Colonel Playfair's present means of making a new survey for a canal on the left bank of the Gutpurba river.

COLONEL PLAYFAIR replied that he had Lieutenant Smith on it at present along with three or four surveyors, and he should like to get as many more surveyors as could be obtained. He could not get surveyors from the Public

Works Department, but if Lieutenant Smith was authorised to promise that the men employed would be taken into the Public Works Department, he thought they might be picked up in Bombay.

COLONEL KENDALL said if they passed the test for admittance he would be very glad to take them into the Public Works Department.

COLONEL PLAYFAIR said that want of surveyors was the great difficulty. There were very many valuable projects sanctioned, and many similar ones over the whole face of the country to be matured, which only required surveying assistance.

SATTARA COLLECTORATE.

In reference to the restoration of the Rewadec Canal in the Sattara Collectorate, a discussion arose on the principle according to which the cultivators should be assessed for the supply of water which they were obtaining, the assessment not having been as yet finally settled.

COLONEL PLAYFAIR remarked that if the canal had belonged to a private individual he would have made a large fortune by it. It had cost the Government a large sum. If the water were to be sold by auction a very large revenue might be got. People, however, were very narrow-minded in that part of the country in their calculations about the value of water. The whole revenue he wanted from it was about Rs. 7,000, and therefore Government could not be very much injured even if the people stopped taking the water for a while in the hope of forcing Government to allow them to have it at a low rate; that the Rewadec Canal commanded more land than it could supply with water, the demand for which was therefore very great; and that if, as at an auction, man were pitted against man, very large sums would be obtained for it.

The HONOURABLE MR. ERSKINE did not think that more should be got than Government was sure was a fair return.

The HONOURABLE MR. ELLIS said the same quantity of water was not of the same value to everybody. Although the Khandeish rates might be borne with perfect ease, yet under other circumstances the same rates would not, even though the quantity of water was the same, and although the water given was as good, as sweet, and as useful. In a mercantile view it was as valuable; but when one came to look at it with the view that a paternal Government must be supposed to take of it, he did not think Government should squeeze the last farthing out of it. He was not sure but that in some places the ryots were rack-rented.

HIS EXCELLENCY the PRESIDENT said there were conflicting views on the subject of the remunerativeness of irrigation. It was said on the one hand that irrigation would not pay; that the money spent upon it was money thrown away. That was an extreme view, but it was urged with a good deal of authority. On

the other hand nobody would tell what any expanding irrigation work would pay because the price of water was always mixed up with the settlement of land. In the case with which Colonel Playfair had to deal there were some means of ascertaining the value of water because there was an assessment made on dry and unirrigated land. It was undoubtedly the duty of the Government to say it was bound to the ryots of the country to give them as much irrigation as possible, but it depended a good deal upon how this first speculation of Government's turned out. If Government took a very paternal view of the question, and allowed the ryots in the present instance to get the water for nothing, was that not doing injustice to other parties? It would hardly be fair to pit man against man, because either pride or other evil purposes would take the place of their sense of industry. But if Government said it had got a very limited supply of this precious water which everybody was wanting to have, and would give it to those who would make use of it, and instead of putting on fancy rates, if it were to put on rates which he (His Excellency) knew would be paid in Khandeish, that might be fair. He asked the other members of Government if they did not think they might trust the local officers to put on at least the Khandeish rates, which it was well known to every one could be paid, and which left a good profit.

The HONOURABLE MR. ELLIS was not prepared to say that merely because these rates had been paid in Khandeish they should be paid in Sattara. Neither was he prepared to say, on the other hand, that water should be given for nothing. He only wanted to recompense Government for the outlay it had made. The exact outlay in the present case had been ascertained, and the question was what could Government afford to let the ryots have the water at so as to give Government a reasonable return for its outlay. The test of the actual outlay had been ascertained, and the Engineer and the Revenue officer between them should be left to arrange what was a fair sum to ask from the ryots. If they could show that they had not only provided the ryots with water, but with cheap water, they would have done a much prouder thing than had been shown by Mr. Smollett, or any other person, that certain irrigation works had been made to yield 15 per cent. He should like to see a certain rate of interest charged, and a certain sum by way of a sinking fund to pay off the amount expended; but beyond that he would not expect anything from irrigation works.

The HONOURABLE MR. ERSKINE said there were two modes of testing the value of water. It might be put up to auction, as it were, which would constitute one test, and there was the test of making a computation for the whole of the district. Government might take a mere local valuation, or it might look at the general irrigation of a district as one entire scheme, and say it would have nothing like a local computation. He was rather indisposed to having a local computation.

HIS EXCELLENCY the PRESIDENT was also indisposed to a local computation, but he thought the rates should be fixed. He thought Government should consider what it could get for this new element it had brought into the means of agriculture. If they let the cultivator off easily then, in the first place Government very much limited its means of expenditure on that class of works, and made the cultivator a present of what belonged to the country at large.

The HONOURABLE Mr. ERSKINE said that was the result.

The HONOURABLE Mr. ELLIS replied that if the country got a fair interest for its money and provided for the extinction of the debt that had been incurred, the country had got all that it could desire. He did not think the Government was a great commercial traveller that could go about the country making a profit out of works of irrigation.

HIS EXCELLENCY the PRESIDENT agreed in the last remark of Mr. Ellis, but they all believed it to be the truth that irrigation works were very remunerative, and were highly beneficial to the country, if Government had unlimited means of making them. But Government was still in the infancy of discussion as to their remunerative character, and as the means of making them were very limited, he thought the utmost return that could be obtained should be got without letting cultivators bid against each other. He thought, whatever was done, the rate should be fixed. He said "take the rate which was acknowledged to be a heavy rate as in Khandeish, but which was one that could be paid."

The HONOURABLE Mr. ERSKINE thought the works must all be treated together. Government could not take a separate work and say "we will judge that by the rate it will turn out." The particular work might be a very expensive work.

COLONEL PLAYFAIR said that, with regard to fixing a general rate, the Rewadee Canal was the restoration of an old work where the people were accustomed to irrigation, and that the rate easily obtainable from it *at once* could not be expected from the Krishna Canal *for years*, as the latter was an entirely new work, and the ryots, as it were, unaccustomed to irrigation, but there was no doubt the Rewadee rate would be eventually *the* rate of the districts.

Mr. HADOW said there was a further question beyond all these, and that was, whether the rate might be 15 or 20 per cent., who was to keep the channels in repair?

COLONEL PLAYFAIR said that Government would keep the main channels in repair, but the ryots might keep their own little channels.

In reference to the large dam over the Krishna near Kurrar, COLONEL PLAYFAIR said that the work was very rapidly approaching completion. The

works had sustained a slight injury by the blow of a tree carried down during the rains, but they would be ready for irrigating land next season. He should also bring forward in the present budget two projects for large storage reservoirs.

POONA COLLECTORATE.

COLONEL PLAYFAIR stated, in reference to the Poona water supply, that Colonel Fife had proposed an enormous irrigation project involving 150 plans. He hoped it would be ready for the budget. It was an enormous work which would cost more than a million sterling. The object of the projected supplementary scheme was not merely to supply water to the camp and city of Poona, but to water the whole of the Poona valley. The conversation then digressed to the subject of the Ekrookh Tank at Sholapore. Colonel Playfair stated that the revised plans had been prepared showing the lands of His Highness the Nizam that would be submerged, and the exact area that would be required.

HIS EXCELLENCY the PRESIDENT said that it had been provisionally sanctioned by the Government of India.

COLONEL PLAYFAIR remarked that the Government of India had now issued instructions not to commence the work till further information had been given. A report was in preparation upon the alteration of the estimates and several other points. The Government of India suggested some alterations in the weir in which Colonel Playfair concurred. The original waste weir was in his opinion too small.

The conversation then reverted to the Poona water supply.

COLONEL SCOTT asked when the works for the Poona water supply were likely to be commenced. It would be a great thing if they could be commenced now. Something might be done even now if a small allotment were granted—say Rs. 10,000 or Rs. 20,000. The dam foundation might be laid.

COLONEL PLAYFAIR said that would save a whole season.

HIS EXCELLENCY the PRESIDENT said there was no use going to the Government of India at all until they could go with the whole of the enlarged scheme. There seemed to be no alternative but to press on the complete project.

COLONEL PLAYFAIR said he would be much pleased if the Government of India would see that there were two projects each of which was complete in itself.

The HONOURABLE MR. ELLIS said that the extensive supplementary project was a work of such magnitude that it would take some years to complete it. It was a pity that the smaller scheme which was to supply the whole of Poona and Kirkee should not be proceeded with. It might almost have been completed already.

KHANDEISH COLLECTORATE.

COLONEL PLAYFAIR, in reference to the irrigational works and requirements of Khandeish, said that the works in progress were getting on very well. The Jamda Canal did not carry down sufficient water during the dry season, and he wished to bring forward in the present budget a project for a large lake on the river to supply them with water. He thought it would pay 10 or 15 per cent. This year he would spend 5½ lakhs on irrigation generally in the district, and next year he would spend 20 lakhs.

ORGANISATION OF THE IRRIGATIONAL DEPARTMENT.

COLONEL PLAYFAIR said the only difficulty he had in connection with the department was its organisation, which rendered it necessary for him to send in all his plans to the Superintending Engineer. By the time his plans reached the Superintending Engineer's office the office was full of their own plans. The sending in of the irrigation plans was scarcely necessary now. It would be much better if he were permitted to send them direct to the Revenue Commissioner.

COLONEL SCOTT did not see why they should be sent in through his office. When the arrangement was made it was thought that two opinions were better than one.

COLONEL PLAYFAIR said that when the Irrigation Department was formed it was an experiment, and Colonel Fife, having no subordinates at all, had to take the subordinate Engineers of the Public Works Department. It was quite clear therefore that it was incumbent upon him to send his plans through the Superintending Engineer.

COLONEL SCOTT, in answer to His Excellency the PRESIDENT, expressed his consent to the arrangement proposed by Colonel Playfair.

COLONEL PLAYFAIR remarked that he and Colonel Bell were in the habit of consulting on irrigational matters, and should continue to do so; and that he was sure Colonel Bell did not object to his proposition.

The proceedings of the Conference with reference to Irrigation then terminated.

The Conference proceeded to the consideration of a number of projects for roads which had not been taken up when the subject of communications was formerly before it.

ROAD BETWEEN RUTNAGHERY AND MHAR.

COLONEL SCOTT said that a link in the road between Rutnagherry and Mhar was wanting. If the portion from Chiploon to Rutnagherry were completed the entire distance from Rutnagherry to Mhar would be practicable.

The **HONOURABLE MR. ELLIS** said that Government should recognise one great line of road for the unfortunate Rutnagherry people, who ever since Rutnagherry was a station had been debarred all communication with Bombay during the rains. They could not move abroad at all, and the difficulties of locomotion by the road were such as should not be tolerated in the present century. If Government were to admit that Rutnagherry had a claim to a road connecting it with the centres of civilisation, and enabling the exiles there to go to Poona or Bombay in the monsoon when they wanted to go, the chief point regarding the Rutnagherry road would be decided. There were plenty of local feeders which might be made. This matter could be settled by saying that the road was to be lined out as a first-class road, and bridged and drained in the same way as other roads had been sanctioned, without any obligation to send in a complete plan of their draining and bridging on the road, and then by giving it allotments in each year's budget.

MR. WOODHOUSE, Executive Engineer, Rutnagherry, was desired to bring the matter before the Superintending Engineer, with a memorandum showing what was wanted to make an open clearance over the whole line.

ROAD FROM SIR JAMSETJEE'S BUND TO KIRKEE.

COLONEL SCOTT said he had further to ask His Excellency's sanction to the repair of the road over the river from Sir Jamsetjee's Bund to Kirkee.

COLONEL KENDALL suggested that an estimate of cost should be sent in, and the question could be dealt with. He said there was an allotment for the work.

COLONEL KENDALL said that one of the principal causes which interfered with the proper prosecution of a project was that allotments were made, and the Superintending Engineers would never release one farthing, although it was evident that they would not be able to use the amount of an allotment made to them for any particular work. Any one would be quite surprised by the returns he had received from the Controller. Last year the amount that had not been used by the Superintending Engineers was between seven and eight lakhs of rupees, and yet the Superintending Engineers reported to him that they had not a rupee to spare out of any of their projects; whereas it happened that large sums might be in their hands at the end of the year unused. This was an evil of yearly occurrence, and was particularly the case this year. An allotment might be made for the road referred to by Colonel Scott from Sir Jamsetjee's Bund to Kirkee if Colonel Scott would say what money he could spare out of any of the projects for which grants had been already made. The whole budget assignment had been already appropriated, and a good deal in addition to that.

HIS EXCELLENCY the PRESIDENT said that Colonel Kendall had mentioned that this circumstance occurred yearly, and that it was particularly the case this year. If Colonel Scott and Colonel Bell would impress particularly upon all

the officers that if they kept Rs. 10,000 which could be spent they were really depriving somebody else of the money. They were possibly depriving themselves of it for the purpose of carrying out some other works.

COLONEL SCOTT said that reasons might be given for some of the delay. In the case of the Sassoon building, iron roofs were expected from England. They did not come when they were expected, but the Engineer did not like to deprive himself of the money lest he might not have the money when they came.

COLONEL BELL urged the necessity of a road from Alibaug the whole way to Penn and Kurjut, and that the road should be an Imperial line. An occasional grant he thought might be obtained from the local fund.

MINOR WORKS.

The HONOURABLE MR. ELLIS wished to make a few remarks on the subject of the attention that ought to be given to the wishes of the local fund committees generally. It was a very common idea of Collectors that the people of the country did not take the slightest interest in the matter of improvements. It might be so in some of the outlying districts where the people had no claim to be considered civilised, but in most of the districts it was very far from being the case. In districts like Broach, Kaira, and Ahmedabad the people did take very considerable interest in what was going on, and as they were now being taxed for local objects they felt very bitterly any attempt on the part of the authorities to override them, and to decline paying any attention to their views. Moreover there had been a case mentioned to him in which the local fund committee had been consulted by the Collector, and their wishes had been concurred in by the Collector, but the matter had been referred to a higher authority and set aside. There was a desire on the part of Collectors generally to immortalise their names by large projects, and as one went higher up there was a desire to deal with large projects to the neglect of tanks and other small things in the districts. This course of proceeding would render the local fund unpopular by non-attention to the wants of the people. In the case he had alluded to, the setting aside of the project had caused a great deal of dissatisfaction. It was a very proper thing that large projects should be undertaken and carried out from the local fund for the benefit of the district generally, and that roads should be made from the centre of large market-towns of a district to the centre of other large market-towns; but he thought it would be well, if His Excellency the PRESIDENT concurred with him, that some warning should be addressed to the local officers generally, pointing out to them that the sums at their disposal from the local fund for a large object must be considered to be only a portion of the local fund, and that they must be very careful every year that a certain portion of the local fund was set aside for the small works which were demanded by the local fund committees and the people generally. Possibly if

some of the villages and towns to which he referred were willing to give an equal amount with the local fund committee for the clearance of the tanks and the making of wells, a number of useful small works might be done; but then villages and towns, however willing they might be to contribute, were unable to get anything from the local fund because very large works had been fixed upon, and these had been entered upon the budget. It would be well if the budget were revised to provide for these small works, and it would be well to impress upon officers to make these small works, and thereby prove to the people that the money taken from them was not swallowed up in Imperial works, but was used for works of improvement in which they themselves took a very special concern. He would be very glad if His Excellency agreed with him in thinking that the officers should be informed that it was the wish of Government that the minor works of improvement in a district which were constructed out of the local fund should be carried on simultaneously with any larger works.

HIS EXCELLENCY the PRESIDENT entirely concurred with Mr. Ellis, and he thought the Revenue Commissioner would also entertain the same opinion. A good deal of this taxation was to a considerable extent voluntary, and its object was to elicit what was entirely voluntary for the purpose of assisting, not for the purpose of doing the whole work, but for helping to get the works done, which could only be done by a grant from the local fund. He was sure that the experience of the Revenue Commissioner would be quite at one with what Mr. Ellis had stated.

MR. HADOW, Revenue Commissioner S. D., agreed with Mr. Ellis.

HIS EXCELLENCY the PRESIDENT said that this was a matter in which the popularity of the expenditure was to be looked at more than anything else in the Public Works Department, and the popularity of the expenditure depended upon Government bringing it as much home to the feelings of every one of the villagers as possible. The great object therefore of the local fund committee should be to satisfy the reasonable wants of the rate-payers, and after they have satisfied these reasonable wants, any great bridge or the like should be undertaken.

LOCAL ENGINEERS.

Some discussion arose on an application by MR. ASHBURNER, Collector of Khandeish, that the local Engineer should be responsible only to the Collector of their districts, and should not be under the necessity of sending on their plans to the heads of the Public Works Department. Many works of very trifling cost and importance were subjected to very great delay in consequence of all such works having to be sent on to the Executive Engineer and through him to the Superintending Engineer. In his own collectorate there was a local professional Engineer on Rs. 800 a month, and he might surely be trusted to make a few drains or petty

culverts without having to send in a plan of them to an officer 150 miles off. If he could not be trusted to do that, then there was no use of having such an Engineer on such a salary.

COLONEL BELL resisted the application on the ground that the Executive Engineer was a member of the local committee to which the projects had to be submitted, and he had to send on the plans endorsed with his approval or disapproval to the Superintending Engineer. In reference to the plans of petty drains or culverts having to be submitted for approval, Mr. Ashburner himself did not know what the legal meaning of a drain was.

The members of Government expressed themselves favourable to local Engineers being allowed to execute up to a certain amount certain works from their own plans without having to send them forward for approval as at present.

CLOSING ADDRESS OF THE PRESIDENT.

HIS EXCELLENCY the PRESIDENT said:—GENTLEMEN,—There are a good many questions remaining, some of which I should like very much to discuss at this Conference, but a number of you are anxious to get away to your regular work, and I should be sorry to delay you longer. Those questions therefore which remain we shall discuss with the Superintending Engineers and Revenue Commissioners, who stay behind in Poona. Some of these questions are of great importance, such as the general question of the subordinate members of the Public Works Department, how they were to be trained, and how they were to be got. There is also the general question of admitting military officers or young men who do not belong to the profession of engineers to the department. These are matters which will affect the efficiency of every one in your establishments, and we will do the best we can, with the advice of the Superintending Engineers and Revenue Commissioners, to arrive at a satisfactory determination in reference thereto. If any of you have any particular advice to give on the subject, we shall be very glad if you will stay a few days to discuss them; or if you will leave a statement of your views with the Superintending Engineers or with the Revenue Commissioners, as the case may be, they will be carefully considered. The question of training subordinates is one particularly in which we should have been very glad to hear what officers up at Ahmedabad and officers down at Belgaum had to suggest. However we shall do our best with the means we have by us to arrive at some satisfactory solution of the question. There is one very large question which relates more or less to all the military works at Poona—the question of the fort of Kirkee, which is to cover the ordnance factories. It was, however, scarcely in a position to be discussed, and I am afraid we shall not be in a position to do much for the next month or so. For this reason we will not detain the body of officers any longer in Poona. I have to thank you all individually and collectively for the aid you have given us, and I only hope—though I shall not be here to see it—that these meetings will be

continued in future years. Some of us are apt to think we lose a great deal of time in sitting here, and that we are not so actively and usefully employed as when we are sitting all day at our desk ; but I do not take this view of these meetings myself, for every one of us is the better to get among his fellows and among his superiors and inferiors in professional knowledge. There is one point of special importance, and that is the degree to which these meetings tend to clear up misunderstandings between officers who are for a great part of the year in the jungles, those officers who superintend them, and the Government who is charged with the whole department. I suppose there is no man taking much interest in his work who does not get into a state of chronic dissatisfaction at times with everybody above him, and he is prone to think that others who are not working so hard as he is get the larger measure of Government support, and the money which he takes a pride in expending well. I know that officers who take a hearty interest in their work have a tendency to take that rust which makes them think they are not appreciated, and that they are not working so freely in the department as other men. I know nothing which so surely takes off that feeling as that which makes a man mix with others ; and when he begins to find that nobody in particular is to blame, he then goes away with the impression that if he has been working hard, he has been upon the whole no better than others. The whole body of duties in which we are engaged is one which has enormously increased of late years and which is increasing daily. I was looking at a return which Colonel Kendall gave me showing the progress of the Engineering department in this presidency from the time I came to the country thirty-five years ago. Then there were in the presidency five or six officers employed, and none of them very vigorously, on the sort of works on which the Public Works Department is now busy. As you know, the officers who are now employing their whole time in the department would fill several sheets of printing, and yet I am quite certain we are only at the beginning of things. I feel assured that Colonel Playfair's department is destined to develop itself, just as the Railways have developed themselves, and become an entirely separate branch and almost a separate department in itself. Every year I think will see an increase in the work which the Engineers—Military and Civil—have to do. I can only hope it will be always done in the same spirit as it has been done by the officers whom I have had the pleasure of meeting in former years and the present, and in case this should be our last meeting I bid you farewell.

The Conference then terminated.



